APPENDIX B

SITE INTERVIEW DOCUMENTATION

Appendix B
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Groundwater Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB	**EPA ID No.:**	
Subject: Groundwater (general issues, 1,4 dioxane, and Hexavalent Chromium)	**Time: 1:00 p.m.**	**Date: 19 May 2003**
Type: ☐ Telephone xVisit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kristi Shelton and Kursti Runkle	**Title: Senior Engineer and Senior Environmental Scientist**	**Organization: MWH**

Individual Contacted:		
Name: Brenda Callen	**Title: Project Manager**	**Organization: URS**
Telephone No: 916-643-1814 **Fax No:** **E-Mail Address: brenda_callen@urscorp.com**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Changes to system since 1999 included:

- Upgrading the air stripper to handle 2000 gpm
- Addition of al zaida thermal oxidizer
- Phase 2 items

Current configuration is all water runs through stripper, then vapor goes through thermal oxidizer and water goes to LGAC for polishing.

- Later portion of water will run through ion exchange for hexavalent chromium treatment

Ultraviolet System

- Originally used for OUD and OUC Northern wells (9 Wells) for treatment of vinyl chloride
- Shut off at end of 2001 when levels dropped
- The system did work to treat the 1,4-dioxane, however, it also created hex chromium
- The future plan includes using the UV system to treat the dioxane and then treat the hex chromium with the ion exchange system

Common Causes of System Shutdown include power out gages. When the system shuts down an alarm goes off and the system calls the operator. : The operator can log in and check the system remotely.

Pipe Leaks

- Incidents include cars and lawn mowers hitting the above ground pipeline. URS is working on a cost estimate to move the most vulnerable portions of the pipeline below ground.
- The pipeline is walked weekly to inspect for leaks.
- The system can sense drops in pressure and will shut down if a pipe ruptures.

Hexavalent Chromium

- Had a notice of violation in 1999 due to hexavalent chromium spike (once Phase II wells were brought on-line).
- Put procedure into place to analyze hexavalent chromium during first week of month. If result was < 10 ug/L, then continue discharging to the creek. If result > 10 ug/L, then 2 additional samples would be taken over the next two weeks. If average result < 10 ug/L, discharge to the creek; if > 10 ug/L, then discharge to the sewer.
- The sewer capacity is limited. Normally would have to shut off wells when diverted to the sewer, but because wells are currently off-line because of the hex chrom issues, wells do not have to be shut off currently when water is diverted to the sewer.
- Long term plan is to continue to discharge to the creek, because a habitat has been created.

1,4-Dioxane

- In 1995 samples were collected (analyzed by 8240) from 5 wells to be analyzed for 1,4-Dioxane. Detections were observed (ND to 8.7 ug/L), but no further action was requested by the RWQCB.
- In 2002, started sampling wells for 1,4-dioxane.
- Currently, the effluent is not being treated for 1,4-Dioxane. In April started analyzing the effluent for 1,4-dioxane. The result (1.5 ug/L) was below the current PRG (6.1 ug/L).

System Costs:

- URS is working on a life cycle analysis to determine if they are using the system efficiently
- Also looking at components to check for future failure
- Will look at the design flows for the extraction wells to see if they are operating to design and if not why

Dual Phase Extraction Systems

IC 29

- System uses similar treatment method (small stripper with GAC) to pre-treat the water before sending it to the main GWTP
- System installed because of high concentrations and concern that sending these high concentrations through all the piping to the GWTP untreated could be a danger if there was a pipe rupture
- Water is blended with other water from EWs and sent to the GWTP

IC 23

- Sampled monthly with the SVE program and results are in the SVE report
- Sampled with groundwater program during OUA sampling annually
- System was off because of radon concerns but is back on now
- Walls were installed around the carbon canisters to prevent worker/public exposure to radon buildup in the carbon
- Following treatment the water is discharged to the sewer – not sent to GWTP

Other DPE wells

- All other DPE wells listed in SVE program are treated as regular extraction wells in the GW program. There is no treatment systems at these other locations and the water is sent to the GWTP

NPDES Permit Exceedences

Other than the hex chrom issue there was one hit of selenium, however, the confirmation sample was below the requirement.

RWQCB Emerging Chemicals

- The water board has not asked them to sample for these. However, they are already sampling for hex chrom and dioxane.
- They are sampling 6 wells for perchlorate in locations around a former lab. The samples have all been ND. They will sample to get a full year worth of results.

Radionuclides

- All samples have been below the levels listed in the FSP.

No issues with worker safety. They conduct quarterly audits of the safety program.

INTERVIEW RECORD

Site Name: McClellan AFB	**EPA ID No.:**	
Subject: Groundwater (general issues, 1,4 dioxane, and Hexavalent Chromium)	**Time: 1:30 p.m.**	**Date: 28 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kristi Shelton and Kursti Runkle	**Title: Senior Engineer and Senior Environmental Scientist**	**Organization: MWH**

Individual Contacted:		
Name: Diane Kiyota	**Title: Project Manager**	**Organization: AFRPA**
Telephone No: (916) 643-0830 ext. 225 **Fax No:** (916) 643-5880 **E-Mail Address:** diane.kiyota@afrpa.pentagon.af.mil	**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652	

Summary Of Conversation

Spoke with Diane regarding the groundwater program at McClellan AFB.

Hexavalent chromium:

- McClellan AFB began sampling for Hexavalent chromium at the groundwater treatment plant effluent. They expanded sampling to monitoring and extraction wells in order to determine where the hexavalent chromium contamination was occurring.

1,4-Dioxane:

- 1,4-Dioxane was first sampled and analyzed in a select number of wells in 1995 in response to a request by the water board. At that time, the water board indicated that 1,4-dioxane was being found at other bases. They recommended using SW8270 for sample analysis. In 1995, a select number of wells were sampled in location of TCE hot spot and were analyzed by SW8260. Results were provided to the water board and no further action was taken. In 2002, McClellan AFB was again requested to look into the issue of 1,4-dioxane as a contaminant. In 2Q02, the wells planned for quarterly sampling and the GWTP effluent were analyzed for 1,4-dioxane by SW8270. The water board is using a water quality limit of 1.3 µg/L (cancer potency factor), although the USEPA has not yet established an MCL.

- It is known that UV/OX is an effective treatment for 1,4-dioxane. On February 21, 2003 the UV/OX treatment system in place (but off-line) at the GWTP was brought on line. It was shut down 10 March 2003. During the course of this study they found that UV/OX was an effective treatment for 1,4-dioxane. However, in the process, hexavalent chromium concentrations increased (CrIII] converted to CrVI). This data will be reported in the 1Q03 quarterly report.

- As a result, 1,4-dioxane is not currently being treated. Currently, the UV/OX treatment system only has the capability to treat a portion of the GWTP influent (TP 2 flow, which consists of some of the OU C and all of the OU D wells). They are in the process of analyzing all monitoring and extraction wells for 1,4-dioxane. When all wells are analyzed, the data will be evaluated and treatment options will be considered. They need to evaluate if the current UV/OX system is sufficient to treat the 1,4-dioxane contamination, or if another system will be needed to treat the portion that would not be treated by the current system.

Notice of Violations:

- Sept 2001 – Hexavalent chromium – due to the data reported in April and May 2001 monthly reports

Exceedences of NPDES Permit:

- Routinely exceed pH variation (limit of $\pm$ 0.5)
- Temperature exceedences (limit of $\pm$ 3 degrees C) – upstream water is cooler than effluent
- 1 selenium exceedence – Oct 3 2001

Emerging Chemicals: 1,4-Dioxane, Hexavalent Chromium, perchlorate have been explored. NDMA has not been explored. 1,2,3-Trichloropropane –this compound is being analyzed by SW8260.

Radionuclides – 2 rounds of sampling (1Q02 and 3Q02) were conducted up and down gradient of potential sources. Two more sample rounds will be done (2Q03 and 4Q03) to have a full year of data. The data will be reviewed and a decision regarding additional sampling will be made.

Off-Base wells:

- In the past people west of the base were given the option of having their wells abandoned, or keeping them for non-drinking water purposes.
- Currently, the AF does not directly monitor off-base private water wells.
- It is not clear how the information regarding the wells is passed to new owners.
- Low levels of 1,1 DCA were detected in a drinking water well at a mobile home park east of the base. Samples were collected from that well and monitoring wells in that area to determine if a potential plume of 1,1-DCA has migrated from McClellan.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Groundwater (general issues, 1,4 dioxane, and Hexavalent Chromium)	**Time: 9:00 a.m.**	**Date: 29 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – GWTP Plant Field Office		☐ Incoming ☐ Outgoing

Contact Made By:		
Name: Kristi Shelton and Kursti Runkle	**Title: Senior Engineer and Senior Environmental Scientist**	**Organization: MWH**

Individual Contacted:		
Name: Darren Ross	**Title:**	**Organization: URS**
Telephone No: (916) 826-1556 **Fax No:** **E-Mail Address: darren_ross@urscorp.com**	**Street Address:** **City, State, Zip:** McClellan, CA 95652	

Summary Of Conversation

Spoke with Darren Ross regarding the GWTP O&M and plant upgrades.

Changes to the GWTP in the past year have been taken to deal with the issues of hexavalent chromium and 1,4-dioxane.

Hexavalent chromium:

- They are in the process of modifying the GWTP to incorporate an ion exchange treatment system for hexavalent chromium.
- Currently, there are 8 GAC vessels.
- Two vessels (T-4 A and B) will be used for ion exchange
- Only a portion of the groundwater flow will be taken through the ion exchange vessels *up to 750 gpm).
- Currently working to remove 'abandoned in place' heat exchangers and piping from the Phase I system. These modifications being made in order to make room for future expansions for hexavalent chromium treatment when the Phase III wells come on line.

1,4-Dioxane:

- 1,4-dioxane will not be treated until after the ion exchange system is in place.
- Current UV/OX system is only capable of treating a portion of the influent flow.
- Plans may involve use of current UV/OX system, but also looking at the possibility of bringing another reactor on line to treat all water.
- UV/OX system creates hexavalent chromium (Cr[III] converts to Cr[VI]).
- Treatment for 1,4-dioxane will occur, then water will flow through ion exchange system.

Issues

- No improper access issues or problems with vandalism
- Injuries – one individual stepped wrong on the berm and twisted his ankle.
- Small diesel spill in parking area from a sampling vehicle. The fuel line for the steam cleaner used for groundwater monitoring separated and approximately 5 gallons of diesel fuel was spilled. An emergency removal action was undertaken by URS.
- O&M Plan to backwash LGAC to the CERCLA wastewater plant; however, the plant cannot handle the amount of water in one event. URS is looking at routing the backwash water to the storage tank and then sampling and discharging to CERCLA plant.

Recommendations

- URS has recommended to the AF that the above ground pipelines should be placed underground in areas that they are prone to accidents, such as OU D (fire, mowing accidents, traffic accidents, etc.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Hexavalent Chromium		**Time:** 1:30 PM **Date:** 5/6/03
Type: □Telephone X Visit □ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		□ Incoming □ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Mike Zabaneh	**Title:** Environmental Engineer	**Organization:** AFRPA
Telephone No: (916) 643-0830 ext. 258 **Fax No:** (916) 643-5880 **E-Mail Address:** mike.zabaneh@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

The source of hexavalent chromium is still unknown, though there are 4 hypotheses as to the source: 1) incorrect analytical or sampling methods, 2) corrosion of system components, 3) natural or offsite source, and 4) AFB operation source (previous plating activities). An investigation is currently proceeding to try to identify the source of Cr(VI).

Currently, modifications to the groundwater treatment plant for ion exchange treatment of hexavalent chromium are scheduled for completion by end of June 2003. Once completed, these modifications will allow for part of the GWTP flow to be diverted through the ion exchange treatment to lower the effluent concentration of CR (VI) to below current discharge limits of 10 ppb. Currently, the effluent flow has had to be diverted to the sewer when levels have reached > 10 ppb. These modifications will prevent discharge to the sewer system.

Additionally, groundwater extraction wells have been turned off to try to reduce the concentration of Cr (VI) in the groundwater effluent. Wells, have been chosen such that they are strategically located near potential sources, and will not result in loss of capture of the VOC plume. The number of extraction wells taken off line to combat the problem fluctuates. They have tried putting wells back on-line, but they were taken off-line again when concentrations spiked.

UV/OX has been explored as a treatment option for 1,4-Dioxane, however, the UV/OX treatment converts Cr (III) into Cr (VI), therefore increasing the concentration in the effluent.

Soil Vapor Extraction (SVE) Program Interview Records

INTERVIEW RECORD

Site Name: N/A		**EPA ID No.:**
Subject: Soil Vapor Extraction (SVE) program		**Time:** 14:00 **Date:** 5/13/03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Dave Kremer	**Title:** Senior Hydrogeologist	**Organization:** MWH
Individual Contacted:		
Name: Stuart Freeman	**Title:** Field Supervisor/Engineer	**Organization:** URS Corporation
Telephone No: (916) 679-2000 **Fax No:** (916) 679-2900 **E-Mail Address:** stuart_freemen@urscorp.com		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present were Stuart Freeman, URS Corporation; and Dave Kremer, MWH.

Discussion: Inspecting all the SVE systems at the former McCellan AFB.

General: We drove by every SVE system and inspected the fence line, security and lighting, and the system configuration. All of the systems, security fencing, lighting, piping, and spill prevention looked in good repair.

Construction Activities: We discussed a few of the current construction activities occurring at various SVE sites. Some repairs to the FTO SVE system at Site IC-19 are being performed. The barrier walls to reduce radon exposure have been completed at all operating VGAC SVE systems. Some lighting and fencing upgrades are occurring at various sites for security reasons.

Performance and O&M Issues: We discussed various aspects of the SVE systems performance. He felt that all of the SVE systems, with the exception of the Site IC-19 pipeline, were operating as intended. The additional oxidizer at IC-19 is expected to improve the site remediation performance. There has been no notice of violations given for any of the SVE system emissions to date. The radon issue has resulted in significant unexpected costs for monitoring and migration, especially at VGAC systems.

Monitoring data indicates that all of the sites are cleaning up. Less sampling and field data are being collected across the base due to low rebounding concentrations and asymptotic conditions, which have resulted in significant cost saving within the SVE program.

INTERVIEW RECORD

Site Name: N/A		**EPA ID No.:**	
Subject: Soil Vapor Extraction (SVE) program		**Time:** 13:00	**Date:** 5/13/03
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		☐ Incoming ☐ Outgoing	
Contact Made By:			
Name: Dave Kremer	**Title:** Senior Hydrogeologist	**Organization:** MWH	
Individual Contacted:			
Name: Paul Graff	**Title:** Senior Geohydrologist	**Organization:** URS Corporation	
Telephone No: (916) 643-1818 **Fax No:** (916) 679-2900 **E-Mail Address:** paul_graff@urscorp.com		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652	

Summary Of Conversation

Present were Paul Graff, URS Corporation; and Dave Kremer, MWH.

Discussion: The entire SVE program at the former McClellan AFB.

Background: We discussed several minor incidents and system modifications that have occurred under the SVE program. The SVE sites have only been accessible to the public since 2001. As a result of community members being briefed on SVE operations in public meetings, there have been no documented complaints regarding the operation of any of the SVE systems. An emergency response of an ambulance to the IC-23 SVE site occurred in March 2003 to address a subcontractor who fell while constructing a barrier wall around the GAC vessels. The IC-32 extraction well was initially piped into the IC-25/27 VGAC SVE system; however, unexpected high TPH concentrations quickly impacted the VGAC system and the IC-32 extraction well had to be piped into the Site 31 CatOx SVE system. A 1000+ foot pipeline connects the IC-19 extraction wells to the OU D CatOx SVE system for treatment. Because of this long pipeline and high VOC concentrations at both sites, a separate thermal oxidizer for IC 19 is being installed and expected to be operational in late 2003. Until then, vapors from IC 19 will continue to be routed to OU D for treatment. In 2001, the PRL T-44 thermal oxidizer SVE system was moved to PRL S-13 and replaced with VGAC at PRL T-44. In 2002, the thermal oxidizer SVE system was moved from PRL S-13 to SSA 2. PRL S-13 is now in rebound mode with no SVE system in place.

Regulatory Considerations: We discussed the use of the STOP procedure approved by the RWQCB for proceeding with the site closure process until which time a ROD will be in place to officially close several of the vadose zone sites. In addition, the only other regulatory concern he had was with the new issues regarding the characterization of the shallow soil gas at all of the VOC (including SVE) sites. This may require an FS addendum to be submitted and will result in a significant field effort with significant associated cost.

Construction Activities: We discussed a few of the current construction activities occurring at various SVE sites. Some of the above mentioned shallow soil gas surveys have taken place and several more are currently being scheduled. Some repairs to the FTO SVE system at Site IC-19 are being performed. The barrier walls to reduce radon exposure have been completed at all operating VGAC SVE systems. Some lighting and fencing upgrades are occurring at various sites for security reasons.

Performance and O&M Issues: We discussed various aspects of the SVE systems performance. He felt that all of the SVE systemswere operating as intended, although there is room for optimization, like the new system proposed at IC 19. The additional oxidizer at IC-19 is expected to improve the site remediation performance. There has been no notice of violations given for any of the SVE system emissions to date. The radon issue has resulted in significant unexpected costs for monitoring and mitigation, especially at VGAC systems.

Monitoring data indicates that all of the sites are cleaning up. Less sampling and field data are being collected across the base due to low rebounding concentrations and asymptotic conditions, which have resulted in significant cost saving within the SVE program.

USEPA, Comprehensive Five-Year Review Guidance, June 2001.

INTERVIEW RECORD

Site Name: N/A		**EPA ID No.:**
Subject: Soil Vapor Extraction (SVE) program		**Time:** 11:00 **Date:** 5/13/03
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Dave Kremer	**Title:** Senior Hydrogeologist	**Organization:** MWH
Individual Contacted:		
Name: Doug Self	**Title:** SVE Program Manager	**Organization:** AFRPA
Telephone No: (916) 643-0830 ext. 202 **Fax No:** (916) 6 **E-Mail Address:** Doug.Self@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present were Doug Self, AFRPA; and Dave Kremer, MWH.

Discussion: The entire SVE program at the former McClellan AFB.

Background: We discussed several minor incidents and system modifications that have occurred under the SVE program. The only site where noise has been an issue to the surrounding community was at Site OU D; however, there has been no formal complaint submitted. The church across the way from SSA-2 inquired about the SVE system operation from a safety point of view and was satisfied with the AFRPA's response. An emergency response of the Base Fire Department to the IC-23 FTO system in 1999 or 2000 was a result of a burnt catalyst smoking a little. The IC-32 extraction well was initially piped into the IC-25/27 VGAC SVE system; however, unexpected high TPH concentrations quickly impacted the VGAC system and the IC-32 extraction well had to be piped into the Site 31 CatOx SVE system. The 1000+ foot pipeline the connected the IC-19 extraction well to the OU D CatOx SVE system incurred several leaks over time making it inefficient. The use of the pipeline was discontinued and Site IC-19 is currently under rebound, but will operate under its own FTO SVE system this year.

Regulatory Considerations: We discussed the use of the STOP procedure approved by the RWQCB for proceeding with the site closure process until which time a ROD will be in place to officially close several of the vadose zone sites. In addition, the only other regulatory concern he had was with the new issues regarding the characterization the shallow soil gas at all of the SVE sites. This would require an FS addendum to be submitted and would result in a significant field effort with significant associated cost.

Construction Activities: We discussed a few of the current construction activities occurring at various SVE sites. Some of the above mentioned shallow soil gas surveys have taken place and several more are currently being scheduled. Some repairs to the FTO SVE system at Site IC-19 are being performed. The barrier walls to reduce radon exposure are currently being finished at all operating VGAC SVE systems.

Performance and O&M Issues: We discussed various aspects of the SVE systems performance. He felt that all of the SVE systems, with the exception of the Site IC-19 pipeline, were operating as intended. There has been no notice of violations given for any of the SVE system emissions to date. The IC-23 dual phase extraction system had an untreated groundwater release; however, it was documented and corrective actions were taken to ensure it would not happen again.

Monitoring data indicates that several of the sites are cleaning up rapidly; however, smear zones and off gassing at the water table are resulting in elevated soil gas concentrations in rebound samples. Less sampling and field data are being collected across the base due to low rebounding concentrations and asymptotic conditions, which has resulted in significant cost saving within the SVE program.

Soil, Groundwater, and Soil Gas RAO Procedures Interview Record

INTERVIEW RECORD

Site Name: McClellan		**EPA ID No.:**
Subject: Soil, Groundwater, and Soil Gas RAO Procedures		**Time:** **Date:**
Type: x Telephone ☐Visit ☐ Other **Location of Visit:**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Mark Bowland	**Title: Senior Scientist**	**Organization: MWH DEI**
Individual Contacted:		
Name: Buddy Walser	**Title:**	**Organization: Mitreteck**
Telephone No: 916-643-0830 ext. 236 **Fax No:** **E-Mail Address:** **buddy.walser@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Requested information regarding process to establish RAOs at McClellan for sites without formal RODs. Mr. Walser provided the following information:

Interim remedies for groundwater are currently based upon MCLs. Interim remedies for soil gases are currently based upon mass reduction via SVE. The current stop process for soil vapor includes: VOCs detected greater than 15 feet bgs, an assessment of potential impacts to groundwater; soils less than 15 feet bgs, assessment of potential impacts to indoor air. For determining potential impacts to groundwater, Mr. Walser stated that VLEACH or the most current soil to groundwater model mandated by regulatory guidance would be utilized. For determining potential impacts to indoor air, Mr. Walser stated the Johnson and Ettinger model or the most current indoor air model available and mandated by regulatory guidance will be utilized. The benchmarks of acceptable exposure currently proposed by the Air Force include a hazard index (HI) of 1.0 or an incremental lifetime cancer risk (ILCR) of 1×10^{-6} for residential receptors.

In determining RAOs for soils, the current proposed objective is an HI <1.0 and a cancer risk $<10^{-6}$ for residential receptors. For sites where these metrics are exceeded, Mr. Walser indicated that site-specific risk assessments would be conducted to determine the RAOs for residential receptors. The risk assessment methodology that will be employed will include the methodologies outlined in the *Installation Restoration Program, McClellan Air Force Base, Operable Unit A, Part 2A – Interim Basewide Remedial Investigation Characterization Summaries, Volume 11 of 14 – Appendix C1-C10, Final.* September 2001, prepared by Jacobs Engineering. Mr. Walser indicated that this methodology, or the most recent risk assessment methods and guidance provided by USEPA and Cal/EPA will be employed to conduct these risk assessments. Additionally, the most recent toxicity criteria available from USEPA and Cal/EPA will be employed in these site-specific risk assessments. In determining the RAOs for soil COCs, the Air Force has proposed determining COC-specific RAOs based upon the risk assessment practices outlined in *Operable Unit A, Part 2A – Interim Basewide Remedial Investigation Characterization Summaries, Volume 11 of 14 – Appendix C1-C10, Final*, as modified to account for the most current risk assessment practices. The target risk and hazard indices will be a hazard index (HI) of 1.0 or an incremental lifetime cancer risk (ILCR) of 1×10^{-6} for residential receptors for each COC.

OU B1 Cap Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB OU B1 Cap, OU D Cap, Dredge Tailings, PRL 32		**EPA ID No.:**
Subject: OU B1 Cap		**Time: 1030** **Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Paul Bernheisel	**Title: Regional Field Engineer**	**Organization: AFCEE**
Telephone No: 916-643-0830 x240 **Fax No:** **E-Mail Address:** **paul.bernheisel@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

OUB1

The current tenant at the cap is HDC, which is a shipping company.

AFCEE is responsible for coordinating the O&M activities.

Dredge Tailing at Magpie Creek

BCT disagreed on the idea of phytore mediation because of the ongoing maintenance activities. The RPO was critical of Brunner's plan. Brunner does not want sites that will require institutional controls. He would like to remove contamination and have the site clear for unrestricted access. The AF is currently working on funding for and EE/CA for this site.

PRL 32

Following the discovery of plutonium at CS10 the AF was required to sample PRL 32 for plutonium. The soil waste bins were sampled and a slight hit of plutonium was discovered. The site was weatherized and covered with plastic while the restoration was put on hold. URS is working on a sampling plan to sample the pits for plutonium. The site is secured with a fence and locked gate.

OU D

The site is not regulated as a landfill. Landfill gases are not sampled from the vents. There have been no breaches of the liner.

Cap Maintenance

The ongoing maintenance of the activities are going well and repairs are being made promptly.

Institutional Controls

There is wording in the lease for the tenants near the cap regarding how to treat the cap. There was an incident last year where a tenant placed something too heavy on the cap and the tenant had to pay for the repair. There was also an incident where McClellan Park installed a fence through the cap. The permit that was submitted did not clearly state the intent and was approved. McClellan Park drilled and set concrete footings into the cap. The AF had the soil that was removed sampled and disposed of off-site. The fence posts were also sealed around the asphalt cap.

INTERVIEW RECORD

Site Name: McClellan AFB OU B1 Cap		**EPA ID No.:**
Subject: OU B1 Cap		**Time: 0900** **Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Steve Mayer	**Title:**	**Organization: AFRPA**
Telephone No: 916-643-0830 x224 **Fax No:** **E-Mail Address:** **steve.mayer@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Drainage Ditches:

During the excavation of the drainage ditches it was determined that the gunite lined ditches had minimal contamination and all parties agreed to leave it in place. Institutional controls for this ditch include quarterly inspections and maintenance. These inspections have just begun and the first inspection was conducted recently.

Sediment traps are now in place and are sampled quarterly. There was a hit of PCBs in one of the trap (corner of Deaver and Lange Ave) during the 1Q03 inspection. The detection was 520 μg/kg and believed to be due to residual dust left on the gunite following maintenance activities. A hit of residual PCB contamination (1100 μg/kg) was also identified by a sediment sample collected in an unlined portion of the drainage ditch near the southeast corner of the OU B1 cap. The Air Force determined this was remnant PCB contamination, took an additional one-foot lift of soil out of this portion of the drainage ditch, and confirmed it is now a non-detect. Accumulated sediment will be removed as part routine cap maintenance activities.

Long-Term Solution

The IROD states that annual reports will be prepared to summarize the ongoing treatability studies for OUB1 Cap. Steve stated that these reports were done for years and then the decision was made to stop the annual reports when it was shown that all available technologies had been reviewed.

They have tested ex situ thermal desorption, which was the recommended alternative in the IROD and 1999 Five Year Review. This technology would be effective in treating the PCBs. The IROD recommended an in situ treatment, but this is not feasible.

The leading alternatives for the site are: dig & haul, dig & thermally treat, or leave the cap in place. The issue with the cap is the ongoing maintenance costs. The AF spends approximately $45K/year on the maintenance of the two caps (about $35K on OUB1). The cap is probably not the final solution because of the ongoing maintenance requirements. The final solution will be decided in the Strategic Sites ROD. Until the final ROD is signed the AF will continue with the maintenance of the cap.

Cap Maintenance

The ongoing maintenance of the activities is going well and repairs are being made promptly.

Institutional Controls

There is wording in the lease for the tenants near the cap regarding how to treat the cap. There was an incident last year where a tenant placed something too heavy on the cap and the tenant had to pay for the repair. There was also an incident where McClellan Park installed a fence with postholes penetrating through the cap. The permit that was submitted did not clearly state the intent of breaching the cap and was approved. McClellan Park drilled and set concrete footings into the cap. The AF had the soil that was removed sampled and disposed of off-site. The fence posts were also sealed around the asphalt cap to prevent infiltration of storm water.

INTERVIEW RECORD

Site Name: McClellan AFB OU B1 Cap		**EPA ID No.:**
Subject: OU B1 Cap		**Time: 1600** **Date: 5 Aug 2003**
Type: x Telephone ☐ Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Steve Mayer	**Title:**	**Organization: AFRPA**
Telephone No: 916-643-0830 x224 **Fax No:** **E-Mail Address:** **steve.mayer@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Drainage Ditch Sediment Traps:

Purpose of Sediment Traps:

The sediment traps were put in place during the installation of the cap and they continue to be used to detect PCBs if the cap fails and to protect Magpie Creek.

Decision Process for detects in Sediment Traps:

There is currently no official decision process for when something is detected in the sediment traps or when sampling can be discontinued. The AF assumes that the 25 ppb cleanup level that was used during the removal action for the unlined portion of the ditch can be used for these traps. It is also assumed that the concentration cited in the IROD (10 ppm) for consolidation of contaminated soil in the cap will be used to determine when a high hit is found in the trap.

OU D Cap Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB OU B1 Cap, OU D Cap, Dredge Tailings, PRL 32		**EPA ID No.:**
Subject: OU B1 Cap, OU D Cap, PRL 32		**Time: 1030** **Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Paul Bernheisel	**Title: Regional Field Engineer**	**Organization: AFCEE**
Telephone No: 916-643-0830 x240 **Fax No:** **E-Mail Address:** **paul.bernheisel@afrpa.pentagon.af.mil**		**Street Address:** **City, State, Zip:**

Summary Of Conversation

OUB1

The current tenant at the cap is HDC, which is a shipping company.

AFCEE is responsible for coordinating the O&M activities.

Dredge Tailing at Magpie Creek

BCT disagreed on the idea of phytore mediation because of the ongoing maintenance activities. The RPO was critical of Brunner's plan. Brunner does not want sites that will require institutional controls. He would like to remove contamination and have the site clear for unrestricted access. The AF is currently working on funding for and EE/CA for this site.

PRL 32

Following the discovery of plutonium at CS10 the AF was required to sample PRL 32 for plutonium. The soil waste bins were sampled and a slight hit of plutonium was discovered. The site was weatherized and covered with plastic while the restoration was put on hold. URS is working on a sampling plan to sample the pits for plutonium. The site is secured with a fence and locked gate.

OU D

The site is not regulated as a landfill. Landfill gases are not sampled from the vents. There have been no breaches of the liner.

Cap Maintenance

The ongoing maintenance of the activities are going well and repairs are being made promptly.

Institutional Controls

There is wording in the lease for the tenants near the cap regarding how to treat the cap. There was an incident last year where a tenant placed something too heavy on the cap and the tenant had to pay for the repair. There was also an incident where McClellan Park installed a fence through the cap. The permit that was submitted did not clearly state the intent and was approved. McClellan Park drilled and set concrete footings into the cap. The AF had the soil that was removed sampled and disposed of off-site. The fence posts were also sealed around the asphalt cap.

INTERVIEW RECORD

Site Name: McClellan AFB OU D Cap		**EPA ID No.:**	
Subject: OU D Cap		**Time: 0900**	**Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing	
Contact Made By:			
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**	
Individual Contacted:			
Name: Steve Mayer	**Title:**	**Organization: AFRPA**	
Telephone No: 916-643-0830 x224 **Fax No:** **E-Mail Address:** **steve.mayer@afrpa.pentagon.af.mil**		**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Cap Maintenance:

There have been no major issues with the cap. Ongoing maintenance includes mowing, cleaning the ditches, checking for erosion, repair of minor cracks, etc. These repairs have all been made in a timely manner.

Long-Term Solution

The long-term solution for the site will be decided in the Strategic Sites ROD. Potential options include dig & haul, dig and treat, dig and consolidate, or leave the cap in place.

PRL S-033 Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: PRL S-033		**Time: 0900** **Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Steve Mayer	**Title:**	**Organization: AFRPA**
Telephone No: 916-643-0830 x224 **Fax No:** **E-Mail Address:** **steve.mayer@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

The site was excavated to 1x10^-6 risk levels including a produce pathway. The site is ready for unrestricted land use. The site will be included in the Initial Parcel ROD as a no action site.

PRL 32 and CS 10 Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB OU B1 Cap, OU D Cap, Dredge Tailings, PRL 32		**EPA ID No.:**
Subject: OU B1 Cap, OU D Cap, PRL 32		**Time: 1030** **Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Paul Bernheisel	**Title: Regional Field Engineer**	**Organization: AFCEE**
Telephone No: 916-643-0830 x240 **Fax No:** **E-Mail Address:** **paul.bernheisel@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

OUB1

The current tenant at the cap is HDC, which is a shipping company.

AFCEE is responsible for coordinating the O&M activities.

Dredge Tailing at Magpie Creek

BCT disagreed on the idea of phytore mediation because of the ongoing maintenance activities. The RPO was critical of Brunner's plan. Brunner does not want sites that will require institutional controls. He would like to remove contamination and have the site clear for unrestricted access. The AF is currently working on funding for and EE/CA for this site.

PRL 32

Following the discovery of plutonium at CS10 the AF was required to sample PRL 32 for plutonium. The soil waste bins were sampled and a slight hit of plutonium was discovered. The site was weatherized and covered with plastic while the restoration was put on hold. URS is working on a sampling plan to sample the pits for plutonium. The site is secured with a fence and locked gate.

OU D

The site is not regulated as a landfill. Landfill gases are not sampled from the vents. There have been no breaches of the liner.

Cap Maintenance

The ongoing maintenance of the activities are going well and repairs are being made promptly.

Institutional Controls

There is wording in the lease for the tenants near the cap regarding how to treat the cap. There was an incident last year where a tenant placed something too heavy on the cap and the tenant had to pay for the repair. There was also an incident where McClellan Park installed a fence through the cap. The permit that was submitted did not clearly state the intent and was approved. McClellan Park drilled and set concrete footings into the cap. The AF had the soil that was removed sampled and disposed of off-site. The fence posts were also sealed around the asphalt cap.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: PRL 32 and CS 10	**Time: 1500**	**Date: 6 May 2003**
Type: ☐ Telephone x Visit ☐ Other **Location of Visit: AFRPA Office**	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**

Individual Contacted:		
Name: Dave Green	**Title:**	**Organization: AFRPA**
Telephone No: 916-643-0830x227 **Fax No:** **E-Mail Address: david.green@afrpa.pentagon.af.mil**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

RAO for Radiation Sites

He is planning on using the USEPA PRGs or background values whichever is higher for a cleanup level at radiation sites. The Risk Calc model used by Region 9 was developed by Steve Dean and appears to only be used at Region 9 sites. The initial background survey for radiation did not include plutonium. The AF completed a background survey for plutonium, but are still in the process of getting regulatory acceptance of the value.

The 2 pCi/g level was negotiated by EPA, the Air Force and the Navy and is based on an average background value for all of Region 9.

PRL 32

The concentration of plutonium detected in the waste bins was <1pCi/g and less than the PRG.

CS 10

The site is doing a good job at protecting worker safety. One woman fell on the steps leading into the pit and broke a bone (ankle). The workers were briefed again about slip, trip and fall hazards and no changes were implemented.

The external air filters and worker breathing zone filters are regularly sampled and the radiological concentrations are within background values.

Ammunition has been found at the site. Several practice bombs and landmines have been found. A UXO technician is now onsite and monitors the excavator lifts. All of the site workers were trained in UXO awareness. A blast shield is now used to protect the backhoe and the workers stand behind the shield during excavation. A 20 mm projectile was found and is being stored pending disposal.

Radiation sites ICs

Someone entered the Dudley Blvd site several years ago. A more permanent fence and additional signs were added.

CS 10 Interview Records

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: CS 10		**Time: 100** **Date: 6 May 2003**
Type: ☐ Telephone xVisit ☐ Other **Location of Visit: URS Field Trailer**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Krist Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Cliff Gray	**Title: URS Site Manager**	**Organization: URS**
Telephone No: 916-923-1846 **Fax No: 916-923-1853** **E-Mail Address: cliff_gray@urscorp.com**		**Street Address: 5111 Shelton Road, Suite 1** **City, State, Zip: McClellan AFB, CA 95652**

Summary Of Conversation

Contaminated soil containing radium was excavated to non detect using field instrumentation. When possible, soil was excavated to background levels if possible. The interim cleanup level used for radium is 2 pCi/g .

Glass tubes containing a delousing agent were found during excavation. Army personnel were brought in to analyze the tubes and identified the liquids as methyl bromide.

Following the discovery of plutonium at CS 10, PRL 32 was sampled for plutonium and other fission products. The methods used to sample for radium do not detect plutonium. The waste bins of soil were sampled and several samples showed detect for plutonium and americium. Sample results were below the PRG, however, URS is working on an FSP to sample the site for plutonium. The sampling is scheduled for summer 2003.
.

The site is currently covered in plastic to eliminate surface water infiltration. The site is secured by a locked fence with signs. The site will be restored following the final sampling.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: CS 10		**Time: 100** **Date: 5 May 2003**
Type: ☐ Telephone xVisit ☐ Other **Location of Visit: URS Field Trailer**		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kristi Shelton	**Title: Senior Engineer**	**Organization: MWH**
Individual Contacted:		
Name: Ray Lidstrom	**Title: URS Project Manager**	**Organization: URS**
Telephone No: 916-923-1846 **Fax No: 916-923-1853** **E-Mail Address: ray_lidstrom@urscorp.com**		**Street Address: 5111 Shelton Road, Suite 1** **City, State, Zip: McClellan AFB, CA 95652**

Summary Of Conversation

Excavation

The tent construction was complete in Nov. 2001 and the digging began 7 January 2002. Currently 41,000 cubic yards of soil have been removed and the estimate is 57,000 cubic yards.

Following the funding shortfall in November 2002 the soil is stockpiled inside the tent. The soil is analyzed by field screening and segregated into piles depending on the concentrations. A clean liner was placed on top of areas already excavated and the contaminated soil is being stockpiled on the liner. Drums are dug out and sorted inside the smaller tent. Once there is enough drum sorted material, roll offs are filled and they are shipped offsite.

Nothing leaves the tent. All PPE is left inside the tent and shipped with the drum contents. All field forms are done electronically and sent wirelessly to the office.

The excavation is scheduled to be complete by August 2003. It will take approximately 9 months to ship the soil and debris offsite once the funding is available.

Worker Safety

The workers are in Level C during the excavation of soil and Level B during the drum, excavation and opening of any drums. The workers also wear radiation badges. The employee breathing zone and concentraitons are analyzed monthly.

There have been no incidences of worker exposure. All air radiation, organics and metals monitoring has been ok. The health and safety plan is in the Workplan and is being following. The plan follows the NRC 10CFR20 for radiation exposure and OSHA for all else.

Air Monitoring

There is a small inner tent used for opening of the drums. There are four external air-monitoring locations at the four sides of the tent. There are also sample filters on the fans removing air from the tent. These monitors are on 24 hours a day and there have been no detections above background concentrations at any of these points.

RAOs

Currently RAO is to excavate until soil is visually clean. There is a hard pan layer below the pit that workers can visually see. Final cleanup levels will be decided in the FS/FSP which will be final in March 2004. Once the FSP is final confirmation samples will be collected to verify that all contaminated soil has been removed.

The AF will maintain the site until the confirmation samples have been collected, the site is determiend to be clean, and the soil stockpiles have been removed. Ongoing maintenance will include continued monitoring of the air filters, verifying that the soil stockpiles are secure, and maintaining the tent structure.

Surface Water

Surface water is directed around the tent via drainage channels. This water diverts to a stormwater pond. A grab sample is collected after stormevents shower water goes to holding tank, is then trucked to the sewer. There is no direct sewer line anywhere on site.

Security

A chain link fence with top barb wire is located at the perimeter of the site. Workers are required to wear a badge to enter the site. The site is monitored by URS during the day and by the Sherriffs Department of off hours

Land Use Controls/Institutional Controls Interview Records

APPENDIX C

RISK REVIEW AND SUMMARY OF CHANGES TO TOXICITY CRITERIA AND RISK METHODOLOGIES

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls – Field Team Inspections	**Time:** 10:30 am	**Date:** 5/6/03
Type: ☐Telephone X Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Paul Bernheisel	**Title:** Regional Field Engineer	**Organization:** AFCEE

Telephone No: (916) 643-0830 ext. 240 **Fax No:** (916) 643-5880 **E-Mail Address:** paul.bernheisel@afrpa.pentagon.af.mil	**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Paul Bernheisel, AFCEE; Steve Burkhard, WPI, and Kursti Runkle, MWH

Discussion: AFCEE Field Team responsibilities in maintaining Land Use Controls

The AFCEE Field Team is responsible for monitoring and inspecting all sites. Inspections of the base are performed on a daily basis. This includes inspecting fencing, signage, groundwater monitoring pipelines, treatment systems, and other basic housekeeping issues. Any problems identified are noted on a site checklist log. All problems noted during inspections are included in a Summary Report of Field Findings. The responsible party is notified of the problem and is responsible for implementing the recommended corrective action. This report is updated monthly and submitted to the regulators. Additionally, biweekly reports are prepared summarizing problems and/or incidents.

Examples of incidents that have occurred:
OU B1 cap – contractor drilled fence holes through cap. Fence posts were placed; holes were cemented then sealed.
Groundwater piping was hit by a car –
McClellan Park – On unoccupied buildings, McClellan Park locksmith often replaces locks without the AF consent. AF insists on changing locks back or in obtaining new key from McClellan Park.

Currently, AF has hired Sacramento County Sheriffs to do security of AF property. Rounds start in late afternoon (3:30 to 4:00 pm) and go till next morning (7:00 to 8:00 am). The conduct four rounds twice a shift. Patrol property looking for suspect activities. An additional security measure that may be taken in the future includes a light system with remote sensors, in lieu of cameras and monitors.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls – Biologically Sensitive Habitats	**Time:** 2:00 pm	**Date:** 5/5/03
Type: X Telephone ☐ Visit ☐ Other **Location of Visit:** Not Applicable	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH

Individual Contacted:		
Name: Molly Enloe	**Title:** Natural Resources Coordinator	**Organization:** Parsons
Telephone No: (916) 643-0830 ext. 231 **Fax No:** (916) 643-5880 **E-Mail Address:** molly.enloe@parsons.com	**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652	

Summary Of Conversation

Conducted phone interview with Molly Enloe, the AFRPA McClellan On-Site Natural Resources Coordinator.

Discussion: Current Land Use Controls/Institutional Controls in relation to the biologically sensitive habitats at former McClellan AFB.

LUCs/ICs pertaining to biologically sensitive habitats consist of fencing, signage, and encroachment permits. The largest area with vernal pools at McClellan is fenced all around with the exception of the south entrance, which backs to ammunition bunkers (current fireworks operation at this location). There are signs along the road from the south that indicate the area is protected and not to drive off the road.

The airfield is completely fenced, but within the fenced area, there are vernal pool areas that are not fenced. The airfield manager is aware of all activities occurring on the airfield. Therefore, if there are issues with people driving in areas they should not be, the manager communicates this to the appropriate parties, so that action can be taken.

Issues/incidents that have been encountered consist of access issues and mowing incidents. Access issues have occurred with people cutting through fences to gain access to areas that they should not be in; people driving off roads and through vernal pools, and with individuals cutting through sensitive areas to fish in area creeks. Additional fencing and signage have been installed to try to curtail these activities. Additionally, "No Fishing" signs are being posted in order to prevent people from accessing creeks.

Mowing incidents have included landscaping crews mowing through vernal pools. An encroachment permit is required by landscapers in order to mow. As part of this, an AF representative is required to properly delineate vernal pools within the areas to be mowed prior to mowing. Incidents have occurred although encroachment permits have been issued. These incidents can be attributed to the mowers not paying close enough attention to the maps they were given and mowing through areas that were not supposed to be mowed. It is imperative that the landscape supervisor communicates to the mowers regarding areas that they can and can't mow. These incidents have to be reported to the U.S. Fish and Wildlife Service. To date, none of the incidents have resulted in financial compensation.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls		**Time:** 9:30 am **Date:** 4/30/03
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Linda Geissinger	**Title:** Public Affairs Specialist	**Organization:** AFRPA
Telephone No: (916) 643-6420 ext. 109 **Fax No:** (916) 643-5880 **E-Mail Address:** linda.geissinger@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Linda Geissinger, AFRPA; Conny Mitterhofer, MWH; and Kursti Runkle, MWH

Discussion: Status of Communication Plan and Tracking Database as part of the New LUC/IC Management Program.

The LUC/IC Management strategy that is currently being implemented by AFRPA is a well thought out strategy for long-term management of LUCs. It is a common sense approach to make sure that current land use restrictions are adhered to.

The management plan is not a primary document. The State of California wants the program to be enforceable, through a separate State Land Use Covenant. The Air Force is in dispute with the State and US EPA over this issue.

McClellan is currently in the process of implementing the LUC/IC Management Program as outlined by AFRPA. The program will consist of 4 modules (Layering Strategy Worksheet, Management Plan, Communication Plan, and tracking database). This program will put in writing what restrictions are placed on land use, and how they will be managed. The management plan will be built from the Layering Strategy worksheet. The Communication Plan will be an attachment to the Management Plan. It will describe how AFRPA will reach the most important people (key stakeholders) at the time of deed transfer and in the years beyond. It will also remind other stakeholders (those who do not occupy the land, i.e. regulators) of the restrictions placed on the land. The tracking database will track the parcels of interest, the restrictions placed on land, and the frequency of notices required (based on prioritizing/classifying restrictions). It is intended for the database to be usable by the public. At the required frequency, letters will be generated to the key stakeholders notifying and reminding them of the land use restrictions placed on property and consequences of not adhering to those restrictions. Currently, these notifications are being provided only to stakeholders of property that has been deeded.

INTERVIEW RECORD

Site Name: N/A		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls		**Time:** 8:00 am **Date:** 5/5/03
Type: X Telephone ☐ Visit ☐ Other **Location of Visit:** N/A		☐ Incoming X Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Joe Healy	**Title:** Program Manager	**Organization:** USEPA
Telephone No: (415) 972-3269 **Fax No:** (415) 947-3258 **e-mail Address:** healy.joseph@epa.gov	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Phone conversation between Joe Healy, USEPA; Conny Mitterhofer, MWH, and Kursti Runkle, MWH.

EPA's position on Land Use Controls, regarding performance-based language. Referred to Glen Kistner to get a better understanding of this position. In addition to the EPA's position on LUCs, the State of CA and the Air Force have differing positions. If you take the politics away, the main objective is to look the function of LUCs in terms of helping to prevent problems of land user in the future. Regardless of who instituted the LUC and who is paying to enforce it, is it working? The goal of the evaluation being conducted is to look at the process from different angles and to verify that the process as a whole is working.

It is necessary to verify the process by talking to a few selected tenants (3-4) and a few individuals at each business, to see how the lease restrictions are working and being enforced. How are the tenants informed of the lease restrictions? How are the workers at the businesses informed of these restrictions? Currently, enforcing lease restrictions is a function of the Air Force as the lead agency at McClellan. The AF should be enforcing the remedy.

To date, there have been some minor incidents at McClellan (including mowing incidents, paint in a creek, someone jumping a fence, and drilling through a Cap). These are the known incidents. It is also necessary to try to get a handle on how many of these things occur that are unknown. And of those, how significant are they? Although there have probably been other incidents that are unknown, it is the significance (impact) of those that is really critical. The system does need to be monitored however, because minor incidents can turn into major problems. It is necessary to ensure that the level of verification of a certain system is in line with the severity of repercussions if that system is not enforced (i.e. it is necessary to have practical directions for the level of problem).

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls – McClellan Park	**Time:** 3:30 pm	**Date:** 5/6/03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** McClellan Park Office	☐ Incoming ☐ Outgoing	

Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Alan Hersh	**Title:** Senior Vice President	**Organization:** McClellan Park

Telephone No: (916) 965-7100 **Fax No:** (916) 568-2764 **E-Mail Address:** ahersh@mcclellanpark.com	**Street Address:** 3140 Peacekeeper Way **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Alan Hersh and Donna Clark, McClellan Park; Conny Mitterhofer and Kursti Runkle MWH

Discussion: Lease restrictions to enforce Land Use Controls/Institutional Controls.

We indicated that as part of our review of Land Use Controls, specifically Lease Restrictions, we would like to conduct interviews of a few of their tenants. We will provide McClellan Park with a short list of questions we will be asking the tenants. We can then arrange the interviews through Bev Rager.

Lease language outlining the unique environmental conditions at McClellan Park is standard in all of the leases. Additionally, the tenants receive the list of known chemicals that were previously used at/near the site of their location. Before tenants take occupancy of their space, an environmental questionnaire is completed so that McClellan Park is aware of the activities that they will be performing in the leased space. The information contained in the questionnaire can then spur further discussions between McClellan Park and the tenant as to additional conditions that may be required prior to occupancy.

McClellan Park holds quarterly tenants luncheons. These luncheons provide an opportunity for tenants to get more information on topics such as storm water discharge, asbestos remediation, the encroachment permit process, etc. It provides a forum for tenants to ask questions they may have.

McClellan Park has staff which will assist and or take care of the encroachment permit process for tenants Property managers are currently responsible for conducting inspections of the properties they manage. They look for anomalies during their inspections.

Areas for improvement:

Encroachment permit process – McClellan Park spends a lot of time and money reviewing the Administrative Record. McClellan Park is required to prepare health and Safety Plans for specific projects. They feel that there should be a master Health and Safety Plan by AFRPA that can be used as a template. Additionally, the permit process turn around time can often be drawn out excessively. The process appears to be subjective rather than objective. There should be a measurable set of criteria used to evaluate permit requests, rather than someone's interpretation. Overall the process works well.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls		**Time:** 8:30 am **Date:** 5/6/03
Type: □Telephone X Visit □ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		□ Incoming □ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Jay McCain	**Title:** Attorney	**Organization:** AFRPA
Telephone No: (916) 643-6420 ext. 107 **Fax No:** (916) 643-5880 **E-Mail Address:** jay.mccain@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Jay McCain, AFRPA, Conny Mitterhofer, MWH, and Kursti Runkle, MWH

Discussion: Legal perspective of Land Use Controls/Institutional Controls; position of EPA/AF/State regarding LUCs/ICs.

Background: 2 types of ICs: Those in place to protect an active remedial system (fencing, signs, etc.); and those to protect the pathway between contamination and ecological and/or human receptors when waste is left in place (no active remediation is occurring).

The AF position is that they do not want any new post-ROD enforceable documents. They want to spell out the LUCs/Ics in the ROD, but not necessarily how they will be enforced. Neither EPA nor the State of California trusts the AF to do this.

The State's position is that they want a State Land Use Covenant (SLUC) in addition to the requirements that EPA requires. The SLUC would be a contractual promise to use the land in a specific way. The SLUC is a product of California statutes and regulations. When waste is left in place, the waste generator would enter into one of these covenants with the state. It would be much more detailed than the information provided in the ROD.

Currently, the language in the deed indicates that the AF is the enforcing entity. EPA has the authority to enforce against the AF if there is a problem, but not against the landowner (grantee) directly. The State of CA wants authority to enforce the landowner directly. The AF will let the state have the covenant, but doesn't want to sign it (they want it to be signed by the landowner [grantee]). (The Navy has already agreed to sign the covenant, but DoD has put a hold on this action until all Army, Navy, AF can come to an agreement).

LUC/IC process at McClellan: Overall the process appears to be working well. The encroachment permit process seems to work well. There has been a great deal of activity with very little failures (not severe failures, at that).

Received a copy of the standard language that is included in all leases.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls – County of Sacramento		**Time:** 2:30 pm **Date:** 5/6/03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** County of Sacramento office		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Jeanette Musil	**Title:** Environmental Program Manager	**Organization:** County of Sacramento
Telephone No: (916) 646-1746 **Fax No:** (916) 646-9571 **E-Mail Address:** musilj@saccounty.net		**Street Address:** 3331 Peacekeeper Way **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Jeanette Musil, County of Sacramento (LRA); Conny Mitterhofer, MWH; and Kursti Runkle MWH

Discussion: Local Redevelopment Authority oversight of McClellan AFB property.

There is a communication plan in place and working. This communication plan outlines the direction of communication to occur between the Air Force, McClellan Park, the County of Sacramento and all tenants. All parties know whom they need to communicate with, when, and under what circumstances. The purpose of the plan is to keep McClellan tenants and utilities informed of activities that might potentially impact their worksites.

LRA oversees county tenants including airfield management companies and public works.

Areas for improvement in current system of enforcing lease restrictions:
County needs to be kept in the loop when incidents are found during field visits.
When problems are found, they need to be reported in a timely manner.
The current level of communication (communication plan) is appropriate.

CUPA – Certified Unified Program Agency has legal authority to enforce 6 environmental regulatory elements (UST, hazardous waste, hazardous materials, AST, storm water, and) The Sacramento County EMD has local jurisdiction (Bill Frost).

McClellan Park has it's own regulatory scheme (regulatory compliance program).

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls		**Time:** 8:30 am **Date:** 5/6/03
Type: □Telephone x Visit □ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		□ Incoming □ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Mike Prall	**Title:** Environmental Specialist	**Organization:** AFRPA
Telephone No: (916) 643-0830 ext. 206 **Fax No:** (916) 643-5880 **E-Mail Address:** mike.prall@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present: Mike Prall, AFRPA and Kursti Runkle, MWH

Discussion: Spill response program, hazardous waste management, and lease restriction enforcement.

Spill response program: All AFRPA contractors working on base are required to prepare site specific spill plans. AFRPA is responsible for reviewing and approving all site specific spill plans prior to start of work. The site specific spill plan provides the basic procedures to follow if a spill should occur. Additionally, it indicates the individuals to contact in event of a spill. The contractor is responsible for remediating any spills that may occur, but must notify the AF upon occurrence. Incident reports are then prepared following any spills. Incident reports are kept, but no central repository or database exists to contain this information. (I maintain a 3 ring binder of all AFRPA incident reports since 4/01; historical incident reports (<4/01) can be found in the Environmental Record)

Hazardous waste management: Following removal actions conducted by AFRPA contractors, analytical results of waste material and shipping manifests are provided to AFRPA. The manifests are signed by AFRPA and all hazardous waste is tracked by AFRPA. Additionally, AFRPA oversees sewer discharge compliance and obtains the required sewer discharge permit.

Lease restriction enforcement: Program consists of environmental specialist coordinating with the LRA to conduct site visits to tenants. During these site visits, a checklist is completed to verify that the lessee is in compliance with the restrictions indicated in their lease. Additionally, a questionnaire is provided to the tenant for completion prior to the site visit. Currently, this is not an active program. However, the County of Sacramento, Certified Unified Program Agency (CUPA) has an program that looks at many of the same aspects that would be reviewed with the AFRPA site visit. As a result, site visits conducted by AFRPA have been reduced in the past year. The CUPA contact is Bill Frost (875-8589). While the site visits have been reduced, AFRPA and AFCEE field team personnel who go into the field keep their eyes open for potential problems. If potential problems were observed, actions would be taken to contact the appropriate people to ensure that those problems were corrected.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: Land Use Controls/Institutional Controls		**Time:** 11:00 **Date:** 4/30/03
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** Former McClellan AFB – AFRPA Building		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Rick Solander	**Title:** Environmental Scientist	**Organization:** AFRPA
Telephone No: (916) 643-0830 ext. 228 **Fax No:** (916) 643-5880 **E-Mail Address:** rick.solander@afrpa.pentagon.af.mil		**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

Present were Rick Solander, ARFPA; Mike Zabaneh, AFRPA; Conny Mitterhofer, MWH; and Kursti Runkle, MWH.

Discussion: Current mechanisms for enforcing Land Use Controls at former McClellan AFB and the developing LUC/IC management program.

Current mechanisms in place consist of lease restrictions, encroachment permits, soils management plan, zoning/permitting, site controls and spill response. These are individual mechanisms currently working independently to ensure that restrictions on land use are maintained. These mechanisms will remain in place once the LUC/IC management strategy has been implemented. AFRPA is implementing a new management strategy that will consist of four modules (layering strategy worksheet, communication plan, management plan, and a tracking database). This management strategy has been chosen by AFRPA as the method to ensure that LUCs/ICs are being implemented and maintained.

The layering worksheet consists of IC objectives coupled with the mechanisms that will ensure that the ICs are maintained. The layering strategy was developed in conjunction with the regulators and ARFPA attorney. The IC objectives were based on the Remedial Action Objectives for McClellan AFB. ICs only apply to land that has already been deeded. In completing the layering strategy worksheet, it was assumed that residual contamination exists for all sites – this assumption will hold until Feasibility Studies are complete or RODs are in place.

The Management Plan is currently in draft form. Rick Solander hopes to have a draft version complete by June 20. The Management Plan will be draft using the current Layering Strategy Worksheet.

Currently, there is a difference in opinion between the State of California (DTSC), the USEPA, and the AF. Each entity has a different opinion on how LUCs will be enforced. AFRPA is implementing the LUC/IC Management Program; however, this will not be a primary (enforceable) document. The State of California wants an enforceable document (State Land Use Covenant).

INTERVIEW RECORD

Site Name: McClellan AFB	**EPA ID No.:**	
Subject: Land Use Controls/Institutional Controls – Encroachment Permit Process	**Time:** 9:20 am	**Date:** 5/8/03
Type: x Telephone ☐ Visit ☐ Other **Location of Visit:** Not Applicable	☐ Incoming x Outgoing	

Contact Made By:		
Name: Kursti Runkle	**Title:** Senior Env. Scientist	**Organization:** MWH
Individual Contacted:		
Name: Mike Swart	**Title:** Environmental Protection Specialist	**Organization:** AFRPA

Telephone No: (916) 643-0830 ext. 230 **Fax No:** (916) 643-5880 **E-Mail Address:** mike.swart@afrpa.pentagon.af.mil	**Street Address:** 3411 Olson Street **City, State, Zip:** McClellan, CA 95652

Summary Of Conversation

An encroachment permit is required for any on-site excavation activities (any time there will be disturbance of soil), for Air Force projects that will encroach upon a transferred facility (for impacts to tenants) and also to obtain permission to travel off-road (for entrance and egress into biologically sensitive habitats). For off-road travel into biologically sensitive areas, the Natural Resources Coordinator would be responsible for assigning travel routes/restrictions and flagging vernal pools. Excavation within a delineated vernal pool and/or wetland area is not allowed.

The contractor or property tenant interested in obtaining a permit needs to provide a completed questionnaire and a map of the location of activities to be conducted. The map needs to provide sufficient detail of the area of encroachment for the screener to determine the location of the proposed excavation/project. When received, the map is the first thing to be reviewed. If the map is not of sufficient detail, the requester would be notified and asked to provide further details.

When the permit request (completed questionnaire and map) is received, it is logged into an excel spreadsheet and a tracking number (mmddyy-#) is assigned. It is then put into a routing folder and an environmental review checklist is attached. Yellow folders are used for AF requested projects (including AF contractors); red folders are used for all other requesters. The proposed project location is then screened for environmental concerns, i.e. is the location within an IRP site, does it encroach upon a biologically sensitive area, were there past Air Force practices that may require radiological monitoring, etc. Following this screening, a determination is made as to the appropriate RPMs to review the permit application. Any applicable site information as well as the required reviewers is indicated in the spreadsheet.

The permit is then routed to the appropriate reviewers. For environmental RPMs, a section is completed on the environmental screening checklist, which indicates whether or not soil contaminants will be encountered based on the depth of the proposed excavation/boring and reviewing data gathered from past remedial investigations, from historical aerial photographs or from information collected during interviews of past employees. RPM's complete the appropriate section of the screening checklist, annotate documents reviewed and attach excerpts, initial the coordination sheet on the routing folder and then return the folder to Mike Swart. Mike logs the date returned into that reviewer's section on the excel spreadsheet, and then forwards the permit on to the next reviewer if the review process is not completed. The process currently can be slowed down by the time it takes each RPM to review the permit application. The permit application is not reviewed concurrently by multiple RPMs. Following review by all appropriate parties, a final recommendation memorandum is prepared by Mike, which summarizes the review made by all RPMs. If an RPM indicates on the environmental screening checklist that there is a potential to encounter soil contaminants which could pose a health risk at the proposed excavation area, then a Health and Safety Plan (HASP) is required. Mike then requests a HASP from the permit requester. The HASP must address the specific contaminants and be signed by an appropriate health and safety professional. The permit request is put on hold pending receipt of a signed HASP that addresses the contaminants of concern. The permit package, HASP (if applicable) and recommendation memorandum are then presented to the team leader for review. Following the team leader approval the permit is provided to the BEC for review and approval. If the BEC concurs with the recommendation then the permit request is forwarded to the senior AFRPA representative for approval signature on the encroachment permit. A copy of the permit is then retained with the signed original being returned to the requestor.

Currently the largest problem with the process is the length of time that it takes to approve a permit. Some can be processed quickly; however, the process can take up to 4 weeks. Looking into ways to shorten the process, potentially by having all documents electronically and having RPMs conduct reviews concurrently.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: 5 Year Review Interviews		**Time:** 0900 **Date:** 18 Nov 03
Type: ☐ Telephone x Visit ☐ Other **Location of Visit:** AFRPA Office		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Rick Solander	**Title:** Environmental Scientist	**Organization:** AFRPA
Individual Contacted:		
Name: Petty Officer First Class (MK1) Richard Ringer	**Title:** Facilities Engineering Manager	**Organization:** United States Coast Guard, Air Station Sacramento
Telephone No: (916) 643-7646 **Fax No:** **E-Mail Address:**	**Street Address:** 6037 Price Avenue **City, State, Zip:** McClellan, CA 95652	

Summary Of Conversation

This interview with the Coast Guard was very timely since they are in the process of reviewing the real estate documents to complete the legal transaction for their occupancy at McClellan. In preparation for this transaction, MK1 Ringer was aware that there is environmental contamination on the Coast Guard property, but was not sure about the specifics. The Coast Guard Real Estate staff is located in Alameda and had not shared the environmental condition report with the Sacramento Station. They plan to share the information when the real estate transaction is complete. Mr. Solander took the time to review the specifics of the environmental condition with MK1 Ringer. The Site Specific Environmental Baseline Survey was reviewed.

MK1 Ringer was not familiar with the encroachment permit process but was aware that the Coast Guard needed permission from the Air Force to conduct digging activities. Mr. Solander explained the encroachment permit process and provided MK1 Ringer with the proper forms to submit a permit request. MK1 Ringer mentioned that the Coast Guard was planning a project in the near future that would require an encroachment permit.

MK1 Ringer was very familiar with environmental compliance requirements to prevent hazardous waste violations and spills.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: 5 Year Review Interviews		**Time:** **Date:** 13 Nov 03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** McClellan Park office		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Rick Solander	**Title:** Environmental Scientist	**Organization:** AFRPA
Individual Contacted:		
Name: Wynn Latta	**Title: Director of Operations**	**Organization:** Sac Metro Fire
Telephone No: (916) 566-4303 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Mr. Latta is very familiar with the restrictions on the property they reside at. He understands the encroachment permit process - that prior to digging or moving any soil on McClellan, they have to apply for an encroachment permit with AFRPA. They have filed for encroachment permits through AFRPA.

Mr. Latta said he and the Fire District are very aware and pretty familiar with the contamination at McClellan. They are physically located near Confirmed Site 10 and understand that project and the contamination involved. They were provided health and safety training by AFRPA contractors for CS10.

Sac Metro Fire ensures they are not conducting activities that would violate the conditions by the lease by knowing and understanding their lease restrictions, as well as other environmental and safety mandates from the Fire District.

Mr. Latta made favorable comments about the encroachment permit process, and feels that it works smoothly.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**	
Subject: 5 Year Review Interviews		**Time:**	**Date:** 13 Nov 03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** McClellan Park office		☐ Incoming ☐ Outgoing	
Contact Made By:			
Name: Rick Solander	**Title:** Environmental Scientist	**Organization:** AFRPA	
Individual Contacted:			
Name: Ellen Bertuccilli	**Title:** Security Manager	**Organization:** Northrup/Grumman	
Telephone No: (916) 570-4106 **Fax No:** **E-Mail Address:**		**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Ms. Bertuccilli is relatively new to her position. She was aware that due to contamination at McClellan, there are lease restrictions, but did not know the details of those restrictions. She said that Ken Moore is the person who ensures Northrup/Grumman complies with the lease restrictions and dig permits.

Northrup-Grumman is aware and follows the encroachment permit process, but Ms. Bertuccilli was unaware of the details of this process. She also said that though she does not know the specifics about the encroachment permit process, she does know who to contact within her company to address these issues, and to ensure her company is in compliance.

Mr. Solander took this opportunity to inform Ms. Bertuccilli what the encroachment permits are, and what they are for. Northrup-Grumman has obtained 3 encroachment permits in the past year.

Since Ms. Bertuccilli was new to the company, Mr. Solander recapped the interaction that the Air Force has experienced with her company in the past as it relates to encroachment permits and restrictions related to their occupancy.

INTERVIEW RECORD

Site Name: McClellan AFB		**EPA ID No.:**
Subject: 5 Year Review McClellan Park Tenant Interview		**Time:** **Date:** 13 Nov 03
Type: ☐ Telephone X Visit ☐ Other **Location of Visit:** McClellan Park office		☐ Incoming ☐ Outgoing
Contact Made By:		
Name: Rick Solander	**Title:** Environmental Scientist	**Organization:** AFRPA
Individual Contacted:		
Name: Tim Fritz	**Title:** Environmental Manager	**Organization:** SureWest
Telephone No: (916) 786-1320 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

SureWest is aware of lease restrictions pertaining to environmental conditions at their property, and at McClellan in general. They are familiar with the Air Force's environmental report and restrictions in their lease. Mr. Fritz said he knows that while there is contamination at the former base, there is "nothing we should be greatly concerned with".

Various activities have required Sure West to apply for encroachment permits, and they routinely follow proper procedures with the Air Force Real Property Agency. SureWest has obtained five encroachment permits in the past year.

Mr. Fritz stated that SureWest has a dedicated contruction team that is very familiar with the encroachment permit process.

Mr. Fritz described their business plan, which includes details about how they handle hazardous materials.

APPENDIX C
RISK REVIEW AND SUMMARY OF CHANGES TO TOXICITY CRITERIA AND RISK METHODOLOGIES

As part of this Five-Year Review Evaluation, exposure assumptions, toxicity data, cleanup levels, and RAOs were evaluated. A summary of the individual assumptions, changes in toxicity data, and RAOs is provided in the individual Sections 4 through 10. Appendix C provides a more detailed discussion on this evaluation for the following remedial actions:

Tables (located at the end of the text in Appendix C):

C-1 OVERVIEW

This section provides an overview of the changes that have occurred to toxicity criteria and risk methodologies since the last Five-Year Review. These changes affect the calculation or assessment of risk for soil, soil vapor, surface water, groundwater, and radiological contamination occurring at a number of removal action sites or remedial systems. The detailed application of these changes to the evaluation of risk for this second Five-Year Review is included in Appendix Sections C-2 through C-4.

C 1.1 Changes to Toxicity Criteria

There have been several significant changes or proposed changes in toxicity criteria for chemicals of potential concern (COPCs) at McClellan since the 1999 Five-Year Review Report was completed. The following sections provide an overview of the changes to toxicity criteria for the primary COPCs that represent 1) the most significant risk drivers that could affect public health and the environment, and 2) any new information on emergent chemicals that may affect ongoing risk assessments at McClellan.

TCE

The USEPA National Center for Exposure Assessment (NCEA) recently proposed to update the TCE cancer slope factor (CSF) from 0.006 (inhalation) to 0.4, a factor of over 66. If formalized, the inhalation risks associated with TCE vapor utilizing the proposed USEPA CSF would increase risk estimates between one to two orders of magnitude for current indoor air and SVE systems assessments. However, because of the uncertainty surrounding the proposed NCEA CSF revision, DTSC (DTSC, 2003, p. 1–4) and the San Francisco Regional Water Quality Control Board (SFRWQCB, 2003b, p. 1) are currently recommending use of the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) CSFs (oral 0.013; inhalation 0.007; [California OEHHA, 2004 database]) until further notice. For this Five-Year Review, the OEHHA CSF was used as the primary TCE evaluation parameter, and the NCEA value was used to evaluate alternative potential worst case conditions. Although the remedies may be considered protective given the current TCE standard, the pending NCEA CSF for TCE, which is published

in the EPA Region IX PRG tables (2003), represents a potential uncertainty given that the current standard may change in the future.

PCE

Since the last Five-Year Review, the USEPA NCEA has increased the PCE inhalation cancer slope factor to a more conservative level from 0.002 $(mg/kg\text{-}d)^{-1}$ to 0.01 $(mg/kg\text{-}d)^{-1}$. The NCEA PCE inhalation reference dose (RfD) has become less conservative and increased from 0.11 $(mg/kg\text{-}d)^{-1}$ to 0.17 $(mg/kg\text{-}d)^{-1}$.

1,2 DCA

No changes have occurred since the last Five-Year Review.

cis-1,2 DCE

No changes have occurred since the last Five-Year Review.

Detected Emergent Chemicals

Of the six emergent chemicals identified by the California RWQCB, only two have been detected at McClellan (hexavalent chromium and 1,4-dioxane). As of August 2003, there have been no changes to toxicity values for hexavalent chromium or 1,4-dioxane.

Chloroform

USEPA has re-evaluated the oral carcinogenicity data for the chloroform CSFs (USEPA, Integrated Risk Information System [IRIS] database [USEPA, 2003b]) and demonstrated adequate evidence to support classifying chloroform as a threshold carcinogen. Unlike the standard assumption by USEPA for most chemicals, a threshold carcinogen means that some dose level must be exceeded before the chemical is considered to have some risk of inducing a carcinogenic response. USEPA's IRIS database (USEPA, 2003b) indicates that, via the oral route, the dose levels at which this concern arises are above the "safe" dose level established for non-cancer effects (as defined by the reference dose). USEPA still considers the inhalation CSF (i.e., 8.1×10^{-2}) to be appropriate pending further review. Therefore, in the USEPA paradigm, assessment and protection of oral non-cancer hazard is protective of potential oral cancer risks.

This approach differs from Cal/EPA's approach to assessment of chloroform health risks, which still includes the use of an oral CSF $(0.031 \text{ mg/kg-d})^{-1}$.

It should be noted that although the MCL value listed for chloroform is 100 µg/L, this value is not for chloroform alone. The value listed applies to total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform and dibromochloromethane); based largely on technology and economics. Therefore, strict application of the listed MCL as "chloroform" may be misleading and result in misinterpretation. Although for this evaluation, the MCL is treated strictly based on chloroform, implementation of the MCL as an RAO must consider other trihalomethanes. In terms of this Five-Year Review, the assumption that post remediation chloroform is present at the MCL of 100 µg/L is a conservative assumption and therefore protective.

Radionuclides

There have been several changes to the toxicity criteria for radium 226 since the initial assessment of radiological risk at the McClellan. In 1999, three radionuclide slope factors were available to assess risk associated with estimated exposures at the site for all receptors: ingestion slope factor, inhalation slope factor, and external exposure slope factor (3×10^{-10}, 2.8×10^{-9}, and 6.7×10^{-6}, risk/year per pCi/g, respectively). Since 1999, further refinement of the slope factors has resulted in the implementation of the following slope factors: soil ingestion slope factor, soil ingestion slope factor (adults only), food ingestion slope factor, inhalation slope factor, and external exposure slope factors (7.3×10^{-10}, 2.95×10^{-10}, 5.15×10^{-10}, 1.16×10^{-8}, 8.49×10^{-6}, respectively). For radium 226 which was evaluated for this Five-Year Review, overall, the CSFs have become more conservative.

C.1.2 Changes in Risk Methodology

Since the issuance of the Risk Assessment Guidance for Superfund, Volume I Human Health Evaluation Manual (USEPA, 1989, p. 1-3 through 1-10), there have been no significant changes to the basic framework or paradigm used in performing human health risk assessments. However, as summarized below, in the last five years there have been a number of refinements to

the models used for evaluating exposure pathways (especially soil gas vapor migration to indoor air) and calculating risk to potential receptors. The following paragraphs provide 1) an overview of the basic approach to risk assessment as outlined by USEPA, 2) a summary of the McClellan's use of risk assessments, and 3) a discussion of the model refinements used in this Five-Year Review evaluation to screen risks to human health. More detailed discussions of the Five-Year Review risk evaluations of various media and remedial systems are included in Appendix sections C-2 through C-4.

USEPA guidance (USEPA, 1989) outlines four steps for carrying out baseline risk assessments:

- Collection and evaluation of data relevant to human or ecological health and identifying the substances present that are the focus of the risk assessment process.
- Exposure assessment to estimate the magnitude of actual and potential exposures including the frequency and duration of the exposures and the pathways by which receptors are exposed. Conducting an exposure assessment involves analyzing contaminant releases; identifying exposed populations; identifying all potential pathways of exposure; estimating exposure point concentrations for specific pathways based on environmental monitoring data and predictive chemical modeling results and estimating contaminant intake for specific pathways.
- Toxicity assessment of the types of adverse affects associated with chemical exposures, and the relationship between related uncertainties regarding a chemical's carcinogenicity. The toxicity assessment for contaminants is generally accomplished in two steps: 1) hazard identification, which determines whether the exposure can cause an increase in the incidence of an adverse health effect; and 2) dose-response evaluation, which quantitatively evaluates the toxicity information and characterizes the relationship between the dose received and the incidence of adverse health effects. The toxicity assessment derives toxicity values that can estimate the incidence of adverse effects (cancer and non-cancer) occurring in receptors at different exposure levels.
- Risk characterization combines the outcome of the exposure and toxicity assessments to characterize the risk in quantitative and qualitative terms. Chemical-specific toxicity information is compared against both measured contaminant exposure levels and those levels predicted through fate and transport modeling to determine whether current or potential future levels at or near a site are of potential concern.

Risk Assessment at McClellan

This section gives a brief overview of the evolution of the human health risk assessment (HHRA) approach used at McClellan since the base became a National Priorities List (NPL) site in 1987. The initial Five-Year Review (1999) did not address the risk assessment methodology, so it is not sufficient to describe changes since that review. Health risk assessment has gone through four distinct stages at McClellan:

Stage 1: From 1987 to 1993, there was no standardized basewide process. Individual projects and documents followed USEPA guidance and industry practice in accordance with the professional judgement of the Air Force and regulatory agency remedial project managers (RPMs).

Stage 2: In 1993, the Air Force and regulatory agencies signed the *Risk Assessment Consensus Statement* (Air Force, 1993). That document defined a process for conducting human health screening risk screening assessments and full HHRAs. The risk assessment for the *Operable Unit D Remedial Investigation Report* (CH2M Hill, 1994) was conducted in accordance with that document. The risk consensus statement of 1993 represents the first standardized basewide risk assessment methodology. It described four steps to performing risk assessment. First was a screening risk assessment using conservative assumptions and based on Phase I RI data. Second, was a site-specific baseline risk assessment. The third and fourth steps were OU and basewide risk assessment. Receptors for this methodology included current and future residents, casual visitors, commercial/industrial workers, and construction workers. Exposure pathways to be considered were extensive and included incidental soil ingestion, dermal contact with soil, inhalation of dust and vapors indoors and outdoors, ingestion, inhalation, and dermal contact with groundwater, ingestion of and dermal contact with surface water, ingestion, inhalation, and dermal contact with house dust, ingestion of homegrown produce, meat, and dairy products, ingestion and dermal contact with sediments, and ingestion of fish from surface waters. Both the receptors and the exposure pathways were intended to be tailored to site-specific conditions. Only the OU D risk assessment followed this protocol, and no OU or basewide risk assessments were ever performed.

Stage 3: In 1995, the Air Force published the *Operable Unit B Remedial Investigation Report (Interim Basewide RI General Framework Appendices)* (Radian, 1995), and Appendix C of that document defined a detailed process for conducting HHRAs. The *Interim Basewide Remedial Investigation Part 2B: Operable Unit B Remedial Investigation Characterization Summaries* (Radian, 1995) followed that process. The 1995 Appendix C to the *OU B Remedial Investigation Report: General Framework Appendices* (Radian, 1995) was intended to be an appendix to the "living" RI general framework and to serve as the methodology for the HHRAs for OUs A, B, C, and E–H. In the end, however, it was used only for OU B. The receptors to be evaluated were current on-site occupational and construction workers and hypothetical future residents. Off-site receptors and casual visitors were not considered. The exposure pathways to be evaluated were incidental soil ingestion, dermal contact with soil, inhalation of dust in outdoor air, inhalation of vapors in indoor and outdoor air, ingestion of groundwater, inhalation of vapors from groundwater, and incidental ingestion and dermal contact with surface water. In practice, the indoor air pathway was not evaluated for OU B. In addition, shallow data (i.e., data from the surface to 10 feet below ground surface [bgs]) for volatile organic compounds (VOCs) were not used in the HHRA. Based on analysis of data collected for OU B, the Air Force concluded that data shallower than about 20 feet bgs would not reliably show the presence of VOCs and that it was, therefore, more conservative (i.e., more protective) to use 20 ft. bgs data for the risk assessment. The risk assessors for USEPA and DTSC subsequently concluded that several aspects of this methodology were not appropriate, especially the use of 20 ft bgs data for risk assessments because receptors would not normally be exposed to contamination from that depth.

Stage 4: In 1997, the Air Force suspended use of the procedure outlined in Appendix C of the general framework document at the prompting of USEPA and the California Department of Toxic Substances Control (DTSC). A new HHRA methodology was developed in cooperation with those agencies and published as Sections 1–8 of Appendix C of the *Operable Units E, F, G, and H Interim Basewide Remedial Investigation Report, Parts 2E-2H: Remedial Investigation Characterization Summaries* (JEG, 2000). The HHRAs for OUs E–H followed the new methodology, and subsequent HHRAs for OU A and OU C followed the same methodology with minor modifications. The evolution of the risk assessment methodology is described in

considerable detail in Table 4-2 of the 2002 Draft, Revision 2 of the *Interim Basewide Remedial Investigation Report, Part 1 – General Framework* (URS, 2002f). Between 1997 and 1999, the Air Force, USEPA, and DTSC collaboratively developed a new risk assessment methodology to be applied to all subsequent HHRAs, specifically those for OUs A, C, and E–H. That methodology is documented in Sections 1-8 of Appendix C of the OU E–H RICS and with relatively minor modifications in Sections 1-8 of Appendix C of the OU A RICS. When the RICS for OU C is complete, it will also document a slightly modified version of this methodology in Sections 1-8 of Appendix C. The modifications from OUs E–H to OU A then to OU C are primarily updates to the toxicity values for contaminants of concern. Therefore, the HHRAs for OUs A, C, and E–H used essentially the same methodology. A variety of factors were changed from the methodology used for OU B and outlined in the 1995 Appendix C for General Framework document. However, the changes with the largest overall impact were the addition of an exposure pathway for inhalation of VOCs in indoor air and the use of shallow soil gas data (i.e., from 0 to 15 ft bgs) for evaluation of VOC exposures. Receptors to be considered were the hypothetical future resident, occupational worker, and construction worker. Pathways to be evaluated were soil and sediment ingestion and dermal contact, groundwater ingestion, dermal contact, indoor inhalation of VOCs, outdoor inhalation of VOCs and particulates, homegrown produce ingestion, and surface water ingestion and dermal contact. These HHRAs include data from surface to about 15 ft. bgs with most of the data coming from the surface to 10 ft bgs.

For risk assessments that might be performed in the future at McClellan (e.g., for feasibility studies, technical impracticability waivers, or SVE system shut down) the Air Force intends to use the OU E–H methodology updated with the latest toxicity factors and using the USEPA spreadsheets for the Johnson and Ettinger model to predict impacts from inhalation of VOCs in indoor air.

Changes in Risk Methodology for this Five-Year Review

The most significant change (i.e., refinement) to the evaluation of risk at McClellan has been the use of updated models for soil vapor migration to indoor air. In creating the proposed industrial and residential interim soil gas screening values, McClellan used a pre-1999 USEPA spreadsheet

version of the Johnson and Ettinger model. Since the completion of the proposed soil gas RAOs, a change has occurred in the methodology currently recommended for assessment of soil gas vapor migration to indoor air. New draft guidance (USEPA, 2002a) prescribes a tiered assessment process that may lead to modeling of soil vapor intrusion into indoor air utilizing the Johnson and Ettinger model. Furthermore, substantial changes have been made to the USEPA Johnson and Ettinger model since the RAOs were developed. Previous versions of the model did not allow for input of or solution for protective soil gas concentrations directly, rather soil bulk concentrations had to be converted to soil gas equivalent concentrations. There are uncertainties inherent in this conversion, since soil properties must be included. Current versions of the model allow direct input of soil gas concentrations, thereby reducing the uncertainties associated with modeling soil concentrations to soil gas equivalents. Other modifications have also been made to soil and other parameters in the model. Most notably, for this assessment, the vapor flow rate into building changed from a calculated value to a recommended value of 5 L/min.

Another change in methodology noted for this Five-Year Review pertains to estimating the exposure to radionuclides. Specifically, the gamma shielding factor (GSF) used to assess the protection provided by structures from external radiation received from radionuclide-containing soils (background or anthropogenic) has increased from 0.2 to 0.4, which serves to reduce the overall estimated external radiation dosage received. Furthermore, additional assessment pathways have been added to the radionuclide assessment methodology, which includes assessment of radionuclides in agricultural soils. Future site use at McClellan does not appear to include agriculture, so this change of risk assessment procedure does not appear significant for the risk evaluation.

C-2 VOC VADOSE ZONE

C.2 DETAILS FOR VOC VADOSE ZONE EVALUATION (SVE SITES)

As part of the evaluation of the vadose zone interim removal actions, the following three pathways (that could lead to future potential exposure) were evaluated:

- Stack Emissions from the SVE Treatment Systems
- Vapor Intrusion from Shallow Soil Gas into Indoor Air
- Impacts from Soil Gas on Groundwater

Each of these pathways is discussed below.

C.2.1 Stack Emissions from the SVE Treatment Systems

As part of this evaluation, stack emission data from the SVE treatment systems were assessed to determine whether any of the emissions might present a health risk to downwind receptors. For this evaluation, both dioxin/furan as well as VOC data were used in a simple dilution model to estimate a downwind concentration for each COPC, as further detailed below.

Dioxin/furan data were taken from six SVE systems (IC 29/30/31/32 CatOx, IC 34/35/37 FTO, IC 41/42/43 FTO, SSA 2 FTO, OU C1/PRL 66B CatOx, and OUD/IC19 CatOx) which could have a potential to emit dioxins/furans from the CatOx or the FTO units. The VOC data were taken from the OU C1 and OU D SVE systems because these two systems emit higher concentrations of COPCs than the other systems, and therefore, an evaluation using this data would render the most conservative estimate of hazard and risks.

The most recent COPC emission rate data (Table C-1 for dioxin/furan, Table C-2 for VOC COPCs) were combined with the system emission rate (converted to dry gas) to determine the estimated emission rate of each COPC. A simple dilution model (Hanna et al, 1982) was then utilized with the emission rates to estimate a downwind concentration for each COPC. The

model estimates the downwind concentration based on the equation indicated in footnote d on Table C-1. Dimensions of the dilution area were assumed to be 3 meters wide, 6 meters tall (based on the SVE stack height of 20 feet), a downwind receptor at 30 meters, and average Sacramento wind speed of 3.5 meters per second. Estimated outdoor air concentrations are considered conservative as they assume estimated COPC concentrations represent steady state conditions and do not diminish over time. Furthermore, the closest receptor to these SVE systems is greater than 30 meters away. Downwind concentration estimates were then combined with default adult and child exposure assumptions and both USEPA and Cal/EPA toxicity criteria to derive estimates of risk and hazard associated with these downwind concentration estimates. These calculations are presented in Table C-2.

Based upon these conservative calculations, the dioxin/furan emissions are well within or below the acceptable risk range of 10^{-6} to 10^{-4}, as shown in Table C-1. Therefore, assuming that emission rates of dioxins/furans will further diminish with source removal, the dioxin/furan emissions associated with the SVE systems currently appear to be acceptable.

Based upon the conservative calculations for VOC COPCs, the HI was well below 1.0 for both OU C-1 and OU D, as shown in Table C-2. Estimated incremental risks associated with theoretical residential exposures are 10^{-6} or below for both OU C-1 and OU D utilizing Cal/EPA CSFs. Estimated incremental risks associated with theoretical residential exposures are 10^{-6} for both OU C-1 and OU D utilizing previous USEPA CSFs. Assuming that emission rates of COPCs will further diminish with source removal, the cumulative risk estimates are within the acceptable risk range of 10^{-6} to 10^{-4} and the emissions associated with the system currently appear to be acceptable. The use of the emission rates of OU C1 and OU D as being representative of other SVE systems is also considered to be a conservative assumption as these systems have the greatest emission rates compared to other SVE systems operated at the base.

It should be noted, however, that the USEPA National Center for Exposure Assessment (NCEA) recently proposed to update the TCE CSF from 0.006 (inhalation) to 0.4. If this proposed change is formalized, the risks associated with the SVE emissions utilizing USEPA CSFs increase to 10^{-5}. However, in several recently released memoranda (February and March 2003), because of the

uncertainty surrounding the proposed CSF revision, DTSC is currently recommending use of the Cal/EPA (OEHHA) CSF until further notice. In either case, because the cumulative risk estimates using the previous or proposed CSFs are within the acceptable risk range of 10^{-6} to 10^{-4}, the non-dioxin emissions associated with the SVE systems currently appear to be acceptable.

C.2.2 Vapor Intrusion from Shallow Soil Gas into Indoor Air

To evaluate possible intrusion from shallow soil gas into indoor air, RAOs were evaluated utilizing changes in methodology and toxicity of COPCs. Interim RAOs were applied to the new Johnson and Ettinger Model with new toxicity criteria to determine whether the currently used RAOs can be considered protective.

Protectiveness of Current Proposed Preliminary Soil Gas RAOs. The currently proposed soil gas RAOs in the SVE Removal Action Quarterly report (URS, 2003m) included residential and industrial scenario screening levels for shallow soil gas, and equilibrium soil gas concentrations equivalent to MCLs (developed based on CH2M Hill 1999, 2000b, and using Henry's Law constants from the Remedial Investigation General Framework Document [URS, 2002f]). Final RAOs have not been developed but will be developed for the ROD.

Currently, in areas where SVE systems are operating, the pathway from subsurface sources to indoor air is considered to be mitigated because operating SVE systems induce a downward negative pressure gradient which impedes the flow of soil gas into buildings. The BCT consensus is that SVE systems would be considered to affect a 300-ft radius around each extraction well. This does not imply that they effectively remediate this radius, only that they influence it. Where it can be demonstrated that capture zones encompass residual soil vapor impacts, the current remedy is considered likely to still be health protective.

Changes in Methodology and Toxicity. Several changes have occurred in the methodology used to develop RAOs, as well as in toxicity values for the COPCs.

In creating the proposed industrial and residential interim soil gas screening values, a pre-1999 USEPA spreadsheet version of the Johnson and Ettinger model was utilized. Since the completion of the proposed soil gas RAOs, a change has occurred in the methodology currently recommended for assessment of soil gas vapor migration to indoor air. New draft guidance (USEPA, 2002a) prescribes a tiered assessment process that may lead to modeling of soil vapor intrusion into indoor air utilizing the Johnson and Ettinger model (USEPA, 2001a, 2002a) and potential indoor air sampling. Furthermore, substantial changes have been made to the USEPA Johnson and Ettinger model since the RAOs were developed. Previous versions of the model did not allow for input of or solution for protective soil gas concentrations directly, rather several conversions had to be performed (e.g., soil bulk concentrations had to be converted to soil gas equivalent concentrations). There are uncertainties inherent in these conversions as soil properties must be included. Current versions of the model allow direct input of soil gas concentrations, thereby reducing the uncertainties associated with modeling soil concentrations to soil gas equivalents. Other modifications have also been made to soil and other parameters in the model. Most notably for this assessment, the vapor flow rate into building changed from a calculated value to a recommended value of 5 L/min, which is generally more conservative than the vapor flow rates calculated by the model

Five-Year Review Evaluation - Screening. As part of the Five-Year Review evaluation, screening of the preliminary RAOs was conducted using the most current model and toxicity criteria. In calculating the proposed soil gas RAOs, target hazard indices of 1.0 and cancer risks of 1×10^{-6} were utilized as well as McClellan specific soil parameters for vapor permeability, bulk density, total porosity, air-filled and water-filled porosity (CH2M Hill, 1999). Because these soil parameters are measured values and representative of soil conditions at the base, these values are considered more appropriate for use than default soil parameters.

Therefore, for future potential receptors, an assessment of the generic residential and industrial preliminary proposed RAOs was conducted incorporating the site-specific and default modeling parameters utilized in the original modeling presented in CH2M Hill (1999) into the most current USEPA Johnson and Ettinger model for soil gas. Additionally, the new USEPA (2002a) recommended vapor flow rate into building of 5 L/min was incorporated into the model.

Predicted indoor air concentrations from these soil gas values were combined with default residential and industrial exposure parameters, as well as current USEPA and Cal/EPA toxicity criteria, to determine whether these proposed soil gas values may still be protective of human health. The results of this screening are presented in Table C-3.

The results of this screening indicate that based upon the use of the CH2M Hill model parameters (1999), the new default vapor flow rate into buildings, the most current model and toxicity criteria, several of the generic preliminary proposed residential and industrial RAOs for shallow soil gas (<15 feet bgs) no longer specifically meet the protectiveness metrics (1×10^{-6} and HI of 1.0) originally used to derive them. All non-carcinogenic chemicals except acetone, chlorobenzene, chloroform, toluene, cis-1,2-dichloroethene and trans-1,2-dichloroethene are below the target HI of 1.0 with the generic (non site-specific) modeling conditions established in CH2M Hill (1999). Use of the CH2M Hill's generic value for depth to impacts (16 cm) is conservative and may contribute to this conclusion for these non-carcinogenic compounds. All the carcinogenic chemicals have chemical-specific risk estimates that are within the acceptable risk range of 10^{-6} to 10^{-4} utilizing current Cal/EPA or current (excluding the draft TCE revision) USEPA toxicity criteria.

As previously discussed, for TCE, the USEPA NCEA recently proposed to update the CSF from 0.006 (inhalation) to 0.4. If this proposed change is formalized, the risks associated with residential and industrial soil gas proposed TCE RAOs are 10^{-4} and 10^{-5}, respectively. However, given the uncertainties in the proposed CSF, both DTSC and SF Regional Water Quality Control Board are currently recommending use of the Cal/EPA (Office of Environmental Health Hazard Assessment [OEHHA]) CSF until further notice. If the original USEPA or Cal/EPA CSFs are utilized, the risks associated with TCE are 10^{-6} or less. The pending EPA CSF for TCE imparts a great deal of uncertainty to the protectiveness of the proposed interim RAOs for TCE.

The results of this analysis indicate based upon changes in models and toxicity criteria, the generic proposed preliminary shallow RAOs for protection of receptors are less conservative than those that would be calculated utilizing the current model in conjunction with the previous model parameters. Subsequently, and in the absence of site-specific model results, the perceived

protectiveness of several of the preliminary RAOs may be compromised for future potential receptors under the modeling scenarios described above.

According to Mitretek (Personal Communication with B. Walser, Appendix B), final site-specific RAOs for shallow soil gas (0-15 feet bgs) will be based on protection of residential indoor air utilizing site-specific modeling and risk assessment.

For this Five-Year Review, final site-specific RAO development is considered warranted given the uncertainties and the generic nature of the preliminary RAO calculations, and the sensitivity of the model. Because modeling of this type is sensitive to site-specific information, it is recommended defensible site-specific final RAOs be calculated utilizing a risk-based decision process that implements site-specific information including soil parameters, and consideration of intended final land use (or potential ICs).

Another consideration in applying RAOs is the cumulative effect of multiple chemicals potentially present at concentrations approaching the respective RAOs. Because the RAOs for carcinogenic compounds are set to achieve an individual risk level of 10^{-6} , the cumulative effect of multiple chemicals is of less concern than for non-carcinogenic compounds. However, in implementing soil gas RAOs, care should be taken that, given the number of constituents detected in soil gas, the cumulative risk of all COCs to indoor air does not exceed the acceptable risk range of 10^{-6} to 10^{-4}, and does not exceed a cumulative target organ HI of 1.0 (USEPA, 1990, USEPA, 1991a, USEPA, 1991b). The cumulative effect of multiple chemicals potentially present at concentrations approaching the respective RAOs is calculated, but does not constitute driving force in evaluating RAOs.

C.2.3 Impacts From Soil Gas on Groundwater

Changes in Methodology. Preliminary proposed RAOs protective of groundwater were developed based on simple partitioning using Henry's Law constants to derive equilibrium soil gas concentrations equivalent to MCLs (developed based on CH2M Hill 1999, 2000b, and using Henry's Law constants from the Remedial Investigation General Framework Document [URS,

2002f]). Values derived with this simple partitioning procedure should conservatively protect groundwater quality as defined by the California MCLs, as no evaluation of dilution or attenuation is incorporated into this partitioning calculation. These preliminary RAOs should continue to be considered protective of groundwater in the future under the conditions that the MCLs continue to be considered protective of human health and the environment. Discussion of MCLs protectiveness is provided in Section C-2.

According to Mitretek (Personal Communication B. Walser Appendix B), the McClellan START/STOP process will be followed to assess final site-specific RAOs for the protection of groundwater quality (defined as MCLs). The McClellan START/STOP process is described in detail in the Final Basewide Removal Action Work Plan for Soil Vapor Extraction (URS, 2001a, Section 4.0). The process uses qualitative and quantitative decision criteria to evaluate the need to implement, optimize, and/or curtail SVE remedial systems. A key portion of the START/STOP evaluation process is performed to assess whether VOCs in the vadose zone will impact groundwater or impact groundwater above the groundwater standard (URS, 2001a, p. 4-27). Typically, VOC contamination vadose zone modeling is used to assess groundwater impact. McClellan intends to use the most current and appropriate soils to groundwater models (e.g., VLEACH) as mandated by regulatory guidance. Because the most current methods will be utilized, this procedure is considered to be adequate to ensure that the RAOs are technically sound and protective of human health and the environment under the conditions that the MCLs continue to be considered protective of human health and the environment.

C-3 GROUNDWATER

C.3 DETAILS FOR PROTECTIVENESS EVALUATION

This subsection reviews the 1) changes in standards and toxicity on selected COPCs that have occurred since 1999 and the potential effects in terms of consumption of groundwater at MCL levels; 2) vapor intrusion into indoor air from VOCs in groundwater; 3) vapor emissions from the groundwater treatment plant (GWTP) for dioxin/furans, VOCs, and mass emission constituents; and 4) effluent discharge of treated groundwater from the GWTP.

C.3.1 Changes in MCL Standards and Toxicity Criteria.

MCLs are derived based upon three possible metrics: 1) protection against threshold effects (non-cancer) associated with consumption, 2) protection against non-threshold effects (cancer risk) associated with consumption, and 3) technical feasibility. Because the toxicity criteria of some of the chemicals have changed since 1999, protectiveness of the MCLs was evaluated utilizing current standard risk assessment exposure assumptions for adults and children for consumption of groundwater, and current USEPA and Cal/EPA toxicity criteria. Standard default exposure parameters and equations were utilized:

Incremental Cancer Risk = Cw x IRa x EF x EDa/BWa/ATc x CSF

Hazard Index (HI) = Cw x IRc x EF x EDc/BWc/ATnc/RfD

Parameter

ATc	=	averaging time, cancer (25,550 d)
ATnc	=	averaging time, non-cancer (2,190 d)
BWa	=	adult body weight (70 kg)
BWc	=	child body weight (15 kg)
CSF	=	cancer slope factor $(mg/kg\text{-}d)^{-1}$
Cw	=	concentration of chemical in water (MCL), mg/L
EDa	=	adult exposure duration (30 yr)

EDc = child exposure duration (30 yr)

EF = exposure frequency (350 d/y)

IRa = adult water ingestion rate (2 L/d)

IRc = child water ingestion rate (1 L/d)

RfD = reference dose (mg/kg-d)

Based upon these input parameters, the following risks and hazards associated with consumption of groundwater were calculated:

Chemical	**California MCL (ug/L)**	**Cal/ EPA CSF**	**USEPA CSF**	**USEPA RfD**	**Cal/EPA Risk**	**USEPA Risk**	**HI**
1,1,2 – Trichloroethane	5	0.072	0.057	0.004	4 E-6	3 E-6	0.080
1,1 – Dichloroethene	6		NA	0.050	NA	NA	0.008
Benzene	1	0.1	0.05	0.004	1 E-6	6 E-7	0.016
Chloroform	100	0.031	NA	0.010	4 E-5	NA	0.639
Methylene Chloride	5	0.014	0.0075	0.060	8 E-7	4 E-7	0.005
Trichloroethene (TCE)	5	0.0153	0.4	0.0003	9 E-7	6 E-7, 2 E-5[a]	1.0
1,1-Dichloroethane	5	0.0057	NA	0.100	3 E-7	0 E+0	0.003
1,2-Dichloroethane	0.5	0.047	0.09	0.030	3 E-7	5 E-7	0.001
Carbon Tetrachloride	0.5	0.15	0.13	0.001	9 E-7	8 E-7	0.046
cis-1,2-Dichloroethene	6	NA	NA	0.010	NA	NA	0.038
Tetrachloroethene	5	0.54	0.052	0.010	3 E-5	3 E-6	0.032
Vinyl Chloride	0.5	0.27	1.5	0.003	2 E-6	9 E-6	0.011
Emergent Chemicals	Action Level						
Hexavalent Chromium	10	NA	0.011	0.003	NA	NA	0.213
1,4-Dioxane	6.1[b]	0.027	NA	NA	2 E-6	8 E-7	NA
Perchlorate	4-18[c]	NA	NA	0.001	NA	NA	NA[c]
NDMA	0.0013[b]	16	51	NA	2 E-7	8 E-7	NA
1,2,3-Trichloropropane	0.0056[b]	2.0	2.0	0.006	1 E-7	1 E-7	0.00003

[a] Cancer risks include previous USEPA CSF (1.1E-2 $(mg/kg\text{-}d)^{-1}$) and proposed revised CSF (0.4 $(mg/kg\text{-}d)^{-1}$).

[b] Based on the Region 9 PRG for tap water.

[c] Perchlorate: USEPA currently considers concentrations ranging from 4-18 ppb to be safe (USEPA, 2003c); however, no reference dose is currently proposed. Numerical hazard estimates associated with perchlorate are not included in this assessment.

If it is assumed that a future hypothetical resident may place a well into an aquifer remediated based upon these RAOs, and the well is the primary drinking water source, the MCLs for individual chemicals do not present a cancer risk that exceeds the acceptable risk range of 10^{-6} to 10^{-4}, or a non-cancer HI that exceeds 1.0. The estimates of risk and hazard associated with the MCLs may also take into consideration a term called the relative source contribution (RSC) used in calculating some MCLs. The RSC is employed to account for wells that may draw water from an aquifer but which is not the sole source of drinking water. The value of the RSC in MCL calculations is 0.2 (20%). Applying the RSC (assuming a well is not the sole source of drinking water but provides water to a municipal system) reduces the potential risks. Therefore, for individual chemicals, no changes have occurred which affect the protectiveness of the RAO with respect to consumption of water.

It should be noted that although the MCL value listed for chloroform is 100 μg/L, this value is not for chloroform alone. The value listed applies to total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform and dibromochloromethane); based largely on technology and economics. Therefore, strict application of the listed MCL as "chloroform" may be misleading and result in misinterpretation. Although herein the MCL is treated strictly based on chloroform, implementation of the MCL as an RAO must consider other trihalomethanes. Assumption of post remediation chloroform is present at the MCL of 100 μg/L is a conservative assumption.

Furthermore, a USEPA re-evaluation of chloroform oral CSF demonstrated that there is adequate evidence to support classifying chloroform as a threshold carcinogen. Unlike the standard assumption by USEPA for most chemicals, a threshold carcinogen means that some dose level must be exceeded before the chemical is considered to have some risk of inducing a carcinogenic response. USEPA's Integrated Risk Information System (IRIS) database (USEPA, 2003b) indicates that, via the oral route, the dose levels at which this concern arises are below the "safe" dose level established for non-cancer effects (as defined by the reference dose). USEPA still considers the inhalation CSF to be appropriate. Therefore, in the USEPA paradigm, assessment and protection of oral non-cancer hazard is protective of potential oral cancer risks. This

approach differs from Cal/EPA's approach to assessment of chloroform health risks, which still includes the use of an oral CSF.

It should also be noted that the USEPA NCEA recently proposed to update the TCE cancer slope factor from 0.011 (oral) and 0.006 (inhalation) to 0.4 for both routes of exposure. If this proposed change is formalized, utilizing USEPA CSFs, the risks associated with the MCLs would increase 30 times, and potentially would affect the perceived protectiveness of the MCL for TCE. However, in several recently released memoranda (February and March, 2003), because of the uncertainty surrounding the proposed CSF revision, DTSC is currently recommending use of the Cal/EPA (OEHHA) CSF until further notice. This remains an uncertainty in the analysis of the TCE MCL protectiveness.

Consideration must also be given to the potential presence of multiple COCs approaching the MCLs at a single site, and the affect this may have on estimates of cumulative hazard or risk. As shown above, if it is assumed that all 14 COPCs are present in a single well at concentrations equivalent to MCLs, the cumulative effect on risk estimates does not result in a total cancer risk greater than the acceptable risk range of 10^{-6} to 10^{-4} (USEPA, 1991b). However, if the well is the only source of drinking water for a residence (i.e., the RSC is not applied), the cumulative affect on the hazard may result in estimated hazard index greater than 1.0. In such cases where a future potential residence may place a drinking water well into the aquifer, the presence of multiple COCs at levels approaching MCLs must be considered to determine that cumulative risk does not exceed acceptable metrics.

Special care should be taken in evaluating the protectiveness of the action levels for perchlorate, as the science and opinions surrounding the chemical is currently a subject of debate.

Based upon previous actions taken at impacted groundwater sites on the former McClellan AFB, it is reasonably anticipated that future land use on the base will include connecting future water supplies to the existing municipal water supply and not include drawing water from the currently impacted aquifers.

C.3.2 Vapor Intrusion into Indoor Air

Assuming that future residents and commercial workers are utilizing a water supply not provided from the aquifers beneath the former McClellan AFB, another potential human health exposure pathway to VOCs in groundwater would be vapor intrusion into indoor air. To determine whether implementation of the MCLs as RAOs would be protective of this potential pathway, the Draft USEPA Indoor Air Guidance (2002a) together with the Johnson and Ettinger model groundwater screen spreadsheets prepared by USEPA (2001a) were utilized in this evaluation. Screening indoor air cancer risks and hazard indices were estimated for each groundwater COPC utilizing the screening default values in USEPA (2002a) for a loamy sand, the depth to groundwater at McClellan (100 ft bgs) as well as recommended screening default level building parameters (10 m x 10 m x 2.44 m, ACH = 0.25) and vapor intrusion rate (5 L/min), default adult (cancer) and child (non-cancer) exposure parameters, and the current USEPA and Cal/EPA toxicity criteria. The indoor air screening values estimated for each COC are presented below:

Chemical	California MCL Equivalent (µg/L)	Indoor Air Concentration (µg/m^3)	USEPA Indoor Air Screening Risk	Cal/EPA Indoor Air Screening Risk	USEPA Indoor Air Screening HI
1,1,2 – Trichloroethane	5	2 E-2	5 E-8	1 E-7	1 E-3
1,1 – Dichloroethene	6	6 E-1	NA	NA	3 E-3
Benzene	1	2 E-2	7 E-8	3 E-7	7 E-4
Chloroform	100	2 E+0	NA	4 E-6	6 E-1
Methylene Chloride	5	6 E-2	1 E-8	2 E-8	6 E-4
Trichloroethene (TCE)	5	2 E-1	8 E-6/1E-7 [a]	1 E-7	5 E-3
1,1-Dichloroethane	5	1 E-1	NA	8 E-8	2 E-4
1,2- Dichloroethane	0.5	2 E-3	3 E-8	2 E-8	5 E-4
carbon tetrachloride	0.5	6 E-2	3 E-7	1 E-6	2 E-2
cis-1,2- Dichloroethene	6	9 E-2	NA	NA	2 E-3
Tetrachloroethene	5	3 E-1	3 E-7	7 E-7	4 E-4
Vinyl Chloride	0.5	9 E-2	3 E-7	3 E-6	8 E-4
"Emergent" Chemicals	*Action Level*				
Hexavalent Chromium	10	NA	NA	NA	NA
1,4-Dioxane	6.1 [b]	3 E-4	4 E-10	9 E-10	NA
Perchlorate	4-18 [c]	NA	NA	NA	NA
NDMA	0.0013 [b]	5 E-6	3 E-8	1 E-8	NA
1,2,3-Trichloropropane	0.0056 [b]	5 E-3	1 E-6	1 E-6	1 E-3
Total			1E-5/2E-6 [a]	1 E-5	0.62

[a] Cancer risks include previous USEPA CSF (6E-3 (mg/kg-d)-1) and proposed revised CSF (0.4 (mg/kg-d)$^{-1}$).

[b] Based on the Region 9 PRG for tap water.

[c] USEPA currently considers concentrations ranging from 4-18 ppb to be safe (USEPA, 2003c), however, no reference dose is currently proposed. Numerical hazard estimates associated with perchlorate are not included in this assessment.

Based upon these values, the presence of COPCs at their respective MCLs would not result in estimated individual residential cancer risk of greater than 10^{-6} or HI of 1.0, or cumulative incremental cancer risks that exceed the acceptable cancer risk range of 10^{-6} to 10^{-4} or an HI of 1.0. Therefore, in those areas where groundwater is not used as a drinking water source, the proposed RAOs are health protective.

C.3.3 GWTP System Emissions

GWTP exhaust stack TP-23 emissions data from TP-23 (GWTP emission point) were assessed to determine whether the concentrations of COCs emitted from the GWTP systems might present a health risk to downwind receptors.

Dioxins and VOCs

The most recent mass emission rates reported from the GWTP exhaust stack for speciated VOCs (6/26/03) and dioxins/furans (3/17/03) were combined with simple dilution modeling, default exposure parameters and most recent toxicity criteria from USEPA and Cal/EPA.

Additionally, for VOCs not detected during the last sampling event but detected in previous sampling events, half the detection limit of the VOC was also modeled. Review of the historical data suggests that the detected concentrations of COCs in the stack exhaust have been relatively consistent over the past year.

The measured concentrations of speciated VOCs in the GWTP stack gas stream combined with the stack gas flow rate were used to determine the estimated mass emission rate of each COPC (see Table C-4). The most recent emission rate data for dioxins/furans are also presented. These chemical emission rates were combined with a simple dilution model (Hanna et al, 1982) to estimate a downwind concentration for each COPC. Dimensions of the dilution area were assumed to be 3 meters wide, 6 meters tall (based on the stack height of 20 feet), a downwind receptor at 30 meters, and average Sacramento wind speed of 3.5 meters per second. Estimated outdoor (ambient) air concentrations are considered conservative because the closest building (Building 704) where a receptor might be exposed to the GWTP system is greater than 30 meters

away. Downwind concentration estimates were combined with default adult and child exposure parameters and most recent toxicity criteria from USEPA and Cal/EPA to derive estimates of risk and hazard associated with these downwind concentration estimates. Each of these calculations is presented in Table C-4.

The USEPA NCEA recently proposed to update the CSF from 0.006 (inhalation) to 0.4. If this proposed change is formalized, the risks associated with the GWTP emissions utilizing USEPA CSFs increase to 10^{-5}. However, in several recently released DTSC and California RWQCB memoranda (February and March, 2003) (DTSC, 2003 and California RWQCB 2003b), because of the uncertainty surrounding the proposed CSF revision, both DTSC and RWQCB are currently recommending use of the Cal/EPA (OEHHA) CSF until further notice. In either case, because the cumulative risk estimate using previous or proposed CSF are within the acceptable risk range of 10^{-6} to 10^{-4}, the emissions of VOCs and dioxins associated with the GWTP system fall within the acceptable range of risk.

PM, NO_x, SO_x, HF, HCl, and CO

The most mass emission rate data reported from the GWTP exhaust stack for particulate matter (PM) (7/30/02 URS, 2003o), HCl and HF (3/28/03), NO_x, SO_x, and CO (7/29/02) are presented in Table C-5. During the most recent sampling event, only HCl, HF, PM, and CO were detected; values for NO_x and SO_x were reported as below the detection limit. As shown in Table C-5, the measured emission rates for total PM were very low, as expected from this type of treatment system. This is consistent with the fact that no significant source of solid material exists within the groundwater influent stream being treated by the thermal oxidizer to generate significant quantities of PM. In order to complete this analysis, it is conservatively assumed that 20% of the measured PM emission is PM10 (particulate matter less than 10 microns in diameter) since the PM CAAQS are available only for size fractionated PM values (and not total particulate rates).

The estimated emissions of HCl, HF, PM, and CO were combined with simple dilution modeling described above and available air quality standards including CAAQS (available for PM and CO) (California Air Resources Control Board, 2003), chronic RELs (available for HCl), or NRELs (available for HF). These values are presented in Table C-5. The concentration of each

constituent was below the respective available air quality standard. Therefore, the HCl, HF, PM, and CO emissions associated with the GWTP system currently appear to be acceptable.

C.3.4 GWTP Effluent

According to the GWTP discharge requirements (June 17, 2003), USEPA adopted the NTR (i.e., AWQC) on 5 February 5, 1993. Since the last Five-Year ROD review, the SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Water, Enclosed Bays, and Estuaries of California* (known as the SIP) (SWRCB, 2000), and USEPA adopted the California CTR (USEPA, 2000b). Although the SIP was adopted prior to the CTR "in order to expedite the effective date of the policy" (SWRBC, 2000), the SIP nevertheless adopted and outlined requirements for the implementation of the CTR. The discharge requirements state that both the NTR and CTR (SIP) rules contain water quality standard applicable to the McClellan GWTP. Discharge limits for the GWTP are based upon limits set in the SIP, and subsequently the CTR. The CTR and AWQC values are the most current estimates of numerical threshold values considered protective of the health of aquatic receptors of concern.

The discharge requirements for the GWTP outfalls into Magpie Creek and Don Julio Creek via Beaver pond in the discharge requirements are:

- Pesticides: no detected concentrations in effluent with MDLs less than MDLs established in the SIP (CTR/AWQC values by reference).
- Hexavalent chromium, selenium, and mercury: daily maximum/monthly average concentrations less than AWQC/CTR (SIP) values.
- VOCs: VOC concentrations less than 1 ppb with MDLs less than MDLs established in the SIP.
- Survival of aquatic organisms in 96-hour bioassays of undiluted effluent no less than 70% for any one bioassay and 90% for the median of any three consecutive bioassays.

Review of the Draft Final Basewide Quality Assurance Project Plan (QAPP; URS, 2003q) and June 2003 GWTP effluent analytical results suggests:

- The range of speciated VOC MDLs are below available AWQC/CTR values. No VOCs were detected during the June 2003 sampling event;
- The range of inorganic MDLs are below the CTR/AWQC values, and subsequently are sufficiently low to detect concentrations of inorganics that might present a risk to aquatic receptors of concern. Review of the June analytical data suggests inorganics have not been detected at concentrations that exceed the CTR/AWQC;
- The range of pesticide MDLs are generally below the maximum daily CTR/AWQC values. However, several of the maximum MDLs presented in the QAPP (see Table C-6), are below the criterion maximum concentrations but slightly above the chronic CTR/AWQC values. These maximum MDLs may impart some uncertainty to the protectiveness of effluent discharges in instances where elevated MDLs are obtained. However, the range of QAPP MDLs is generally consistent with the discharge limitations.
- Since April 2001, bioassay survival results greater than 90% for 72% of the analyses, and greater than 70% for all results except one (June, 2003).

Therefore, based upon the review of the discharge requirements, GWTP monitoring program and discharge limits for groundwater, COPCs have been established consistent with current water quality standards for the protection of aquatic life. When the discharge requirements for COPCs in GWTP effluent (CTR/AWQC values) are met, the current remedy is considered protective of aquatic receptors of concern. The final ROD should ensure that the selected remedy is protective of sensitive habitats and biologic resources of concern based upon current ARARs, resource mapping, and habitat characterizations.

Because the site is controlled, there currently are no potentially complete exposure pathways for direct human exposure to undiluted effluent discharges from the GWTP other than potential occasional incidental contact. However, comparison of the GWTP discharge requirements (June 2003) for protection of aquatic receptors of concern (CTR/AWQC) to USEPA Region 9 tapwater PRGs (USEPA, 2002d) (assuming the 10^{-6} to 10^{-4} cancer risk range) suggests the discharge requirements are sufficiently protective of potential occasional incidental human contact with surface water. Furthermore, significant dilution is expected as GWTP effluent travels away from the discharge point in Magpie Creek. Review of the recent GWTP effluent analytical results (May, June 2003) do not indicate detected chemicals at concentrations that present a risk to human health, and the detection limits are sufficiently low so as to be protective. Therefore, the

current GWTP discharges are considered protective of human health. The final ROD should ensure that the selected remedy is protective of future potential land uses.

The current discharge requirements do not contain numerical limits for 1,4-dioxane and radionuclides. During the last four rounds of GWTP effluent sampling, 1,4-dioxane was detected at low levels in May and July 2003 (i.e., 1.6 and 1.4 μg/L, respectively) but not detected in June (Table C-6). Currently, no CTR or other ecological threshold levels have been developed for 1,4-dioxane. Therefore, the potential affects on ecological receptors of continued discharge of very low levels of 1,4-dioxane in the GWTP effluent are unknown at this time.

One round of effluent sampling for radionuclides was carried out in Third Quarter 2002, and resulted in detected concentrations of Sr 89/90 and U238 that were well below USEPA human health tapwater PRG values and well below DOE BCGs (USDOE, 2002) for ecological receptors. These and other "emergent" chemicals or constituents, if determined to be present, should be addressed in the discharge limits for these constituents and the final remedy. The final ROD should ensure that the selected remedy is protective of future potential land uses, including sensitive habitats and biologic resources of concern based upon current ARARs, resource mapping, and habitat characterizations.

C-4 SITE PRL 32

C.4 DETAILS FOR EVALUATION OF SITE PRL 32

This subsection reviews the 1) protectiveness of the cleanup levels proposed at PRL 32 for radium 226 and daughter products (Ra226+D) and plutonium 238 and 239, and 2) changes in methodology and toxicity criteria for the radiological and VOC evaluations.

C.4.1 Changes in Radiological Methodology

The gamma shielding factor (GSF), which is utilized to assess the protection provided by structures from external radiation received from radionuclide-containing soils (background or anthropogenic) has increased from 0.2 to 0.4, which serves to reduce the overall estimated external radiation dosage received. Furthermore, additional assessment pathways have been added to the radionuclide assessment methodology, which includes assessment of radionuclides in agricultural soils. Future site use does not appear to include agriculture, so this change of risk assessment procedure does not appear significant for the sites.

C.4.2 Changes in Radiological Toxicity Criteria

There have been several changes to the toxicity criteria since the initial assessment of risk at the property. In 1999, three radionuclide slope factors were utilized to assess risk associated with estimated exposures at the site for all receptors: ingestion slope factor, inhalation slope factor, and external exposure slope factor (3×10^{-10}, 2.8×10^{-9}, and 6.7×10^{-6}, risk/year per pCi/g, respectively). Since 1999, further refinement of the slope factors has occurred and resulted in the implementation of the following slope factors: soil ingestion slope factor, soil ingestion slope factor (adults only), food ingestion slope factor, inhalation slope factor, and external exposure slope factors (7.3×10^{-10}, 2.95×10^{-10}, 5.15×10^{-10}, 1.16×10^{-8}, 8.49×10^{-6}, respectively). Overall, the CSFs have become more conservative, although the increase in conservatism is considered moderate.

C.4.3 Radiological Evaluation

USEPA recently released radionuclide preliminary remediation goals (PRGs; USEPA 2003) with the changes in the toxicity and exposure assumptions discussed above. The PRGs for radium 226 and daughter products (Ra226+D) are higher than the previous 1999 equivalents. For commercial receptors, the PRG has increased 16% from 0.022 pCi/g to 0.0255 pCi/g, Indoor worker PRG for Ra226+D is 0.0573 pCi/g. All of the listed PRGs are based upon a 10^{-6} cancer risk level. At a 10^{-4} cancer risk level, these values are 2.55 and 5.73 pCi/g, respectively. Based upon these PRGs, for the current industrial land use the cancer risks associated with 2 pCi/g of Ra226+D for outdoor workers and indoor workers are 8×10^{-5} and 3×10^{-5}, respectively. Therefore, changes in toxicity and risk assessment practices should have no effect on the overall protectiveness of the interim remedy for radionuclides given its current land use, as well as the future potential industrial land use.

In terms of future potential residential land uses, the residential PRG for Ra226+D has increased 100% from 0.0062 pCi/g to 0.0124 at 10^{-6} cancer risk levels, and 1.24 pCi/g at 10^{-4} cancer risk levels, respectively. Based upon this PRG, the estimated incremental upperbound lifetime cancer risk associated with a future potential resident is 2×10^{-4} for a proposed cleanup level of 2 pCi/g. Appropriateness of final RAOs should be ensured following the final status survey to demonstrate that the site average Ra226+D concentrations do not exceed the interim action level. Such information will assist determination that the total risk to the intended site-reuse receptors (commercial) is within the acceptable risk range.

Based on the reconnaissance and interviews (Appendix B) conducted for PRL 32, plutonium 238 and plutonium 239 have been discovered but at levels less than 1.0 pCi/g. The outdoor worker, indoor worker, and residential PRGs for plutonium 238 are 16.4, 29.7 and 2.97 pCi/g, respectively, at a 10^{-6} cancer risk level (USEPA, 2003a). The outdoor worker, indoor worker, and residential PRGs for plutonium 239 are 14.3, 25.9 and 2.59 pCi/g, respectively, at a 10^{-6} cancer risk level (USEPA, 2003a). Therefore, estimated upper-bound lifetime incremental cancer risks associated with potential exposures to a 1 pCi/g concentration of plutonium 238 or plutonium 239 would be below the acceptable risk range of 10^{-6} to 10^{-4} under current industrial

or future potential residential conditions. Exposures associated with concentrations less than 1 pCi/g of plutonium 238 or plutonium 239 should not pose an unacceptable cancer risk.

C.4.4 Changes in Toxicity and Methodology for VOCs at PRL 32

Although VOCs were not identified as COCs at PRL 32 and the site is not currently occupied, the detections of VOCs and TPH as gasoline in soils were briefly evaluated to determine if changes in methodology or toxicity criteria might affect the assessment of protectiveness. As more fully described in subsection C-1, Vadose Zone, this evaluation considered soil gas migration into indoor air.

A significant change has occurred in the methodology currently recommended for assessment of soil gas migration to indoor air. The new guidance prescribes a tiered assessment process that may lead to modeling of soil vapor intrusion into indoor air utilizing the Johnson and Ettinger model (USEPA, 2002a). The methodologies utilized in the 1993 risk assessment are not consistent with currently advocated methods (USEPA, 2002a) and are likely to be substantially less conservative than the methods currently recommended.

The newly proposed CSF for TCE is 0.4, whereas the previous CSF in 1999 was 0.006. This has a potentially dramatic effect on whether TCE is considered a COC. To clarify this issue for PRL 32, the maximum measured concentration of TCE was modeled utilizing the Johnson and Ettinger Model (2001c). Based upon a site-specific soil type (sandy loam), default soil parameters for this soil type (total porosity = 0.39, water filled porosity = 0.05) and conservative default model values for other parameters (vapor intrusion rate [Q] = 5 L/min, hypothetical building length/width = 100 m, hypothetical building height = 2.44 m), the total theoretical upper-bound incremental lifetime cancer risk estimates associated with the maximum detected soil gas value was within the acceptable cancer risk range of 10^{-6} to 10^{-4}. Therefore, it can be concluded that the implementation of the new CSF for TCE will not change the assumption that TCE is not a COC. Furthermore, although TPH as gasoline was detected in soil gas, the most toxic components of this TPH class (benzene, toluene, ethylbenzene, xylenes) do not appear to

have been detected. Therefore, any changes to the risk assessment methodology are unlikely to change the conclusions that TPH as gasoline in soil gas is not a COC.

Because the site is not currently used and there are no human health receptors at the site, there is no information that calls into question the protectiveness of the interim remedy for human health at PRL 32. This should be reevaluated based upon the final land use selected for the property when the final remedy for the site is chosen.

Table C-1

SVE System: Dioxin/Furan Emission Risk Estimate
Five-Year Review
Former McClellan AFB

Chemical	2,3,7,8-TCDD Concentration (ng/dscm)	Date Last Sampled	Approx. Effluent Flow dscfm	Approx. Effluent Flow dcmm	Chemical Flow (Q) mg/sec[a]	Dilution Area[b] Width m	Length m	Height m	Volume m^3	Wind speed[c] m/s	Downwind concent.[d] mg/m^3	EPA RfC mg/m^3	EPA CSF $(mg/kg\text{-}d)^{-1}$	CalEPA CSF $(mg/kg\text{-}d)^{-1}$	EPA HI[e]	EPA Risk[e]	Cal/ EPA Risk[e]
IC 29/30/31/32 CatOx	1.3 E-2	2/9/2002	819	23	5.0 E-9	3	30	6	540	3.5	8.0 E-12	NA	1.5 E+5	1.3 E+5	NA	1 E-7	1 E-7
IC 34/35/37 FTO	1.2 E-2	8/1/2002	242	7	1.4 E-9	3	30	6	540	3.5	2.2 E-12	NA	1.5 E+5	1.3 E+5	NA	4 E-8	3 E-8
IC 41/42/43 FTO	8.9 E-3	11/19/2002	257	7	1.1 E-9	3	30	6	540	3.5	1.7 E-12	NA	1.5 E+5	1.3 E+5	NA	3 E-8	3 E-8
SSA 2 FTO	6.3 E-3	4/2/2003	300	8	8.9 E-10	3	30	6	540	3.5	1.4 E-12	NA	1.5 E+5	1.3 E+5	NA	2 E-8	2 E-8
OU C1/PRL 66B CatOx	2.3 E-1	4/3/2002	720	20	7.8 E-8	3	30	6	540	3.5	1.2 E-10	NA	1.5 E+5	1.3 E+5	NA	2 E-6	2 E-6
OUD/IC19 CatOx	1.3 E-2	2/4/2002	680	19	4.2 E-9	3	30	6	540	3.5	6.6 E-12	NA	1.5 E+5	1.3 E+5	NA	1 E-7	1 E-7

dscfm = dry standard cubic feet per minute. dscmm = dry standard cubic meters per minute. Note: Unit Risk Factors (URF) are $(\mu g/m^3)$-1 and CSFs= URFx70 kgx1/20m^3/day

[a] effluent concentration (ng/dscm)/1000 µg/ng / 1000 mg/µg x dcmm/60 sec/min

[b] assumes a dilution area 3 meters wide, 6 meters tall (based on SVE stack height of 20 feet), and 30 meters long. Nearest receptors to these SVE systems >30 meters away.

[c] Long term annual average for Sacramento, CA.

[d] Based on Hanna (1987) = Q x Cross wind width of source area (Width)/(Volume x wind speed)

[e] For noncarcinogens = concent. x 350 d/y x 6 yr/2190 days/RfC, for carcinogens = concent. x 20 m³ x 350 d/y x 30 yr/25550 days/70 kg x CSF

Table C-2

SVE System: VOC Emission Risk Estimates
Five-Year Review
Former McClellan AFB

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OU C1- SVE System Emission Risk Estimates - 3/4/03

	Effluent Concentration		Effluent Flow		Chemical Flow (Q)	Dilution Area[b]				Wind speed[c]	Downwind concent.[d]	EPA RfC	EPA CSF	CalEPA CSF	EPA HI[e]	EPA Risk[e]	Cal/ EPA Risk[e]
Chemical	ppmv	mg/m^3	dscfm	dcmm	mg/sec[a]	Width m	Length m	Height m	Volume m^3	m/s	mg/m^3	mg/m^3	$(mg/kg\text{-}d)^{-1}$	$(mg/kg\text{-}d)^{-1}$			
chloromethane	0.67	1.39057	680	19	4.5 E-1	3	30	6	540	3.5	7.1 E-4	9.0 E-2	NA	NA	7.6 E-3	NA	NA
vinyl chloride	0.0043	0.01116	680	19	3.6 E-3	3	30	6	540	3.5	5.7 E-6	1.0 E-1	3.1 E-2	2.7 E-1	5.5 E-5	2 E-8	2 E-7
chloroethane	0.0049	0.01314	680	19	4.2 E-3	3	30	6	540	3.5	6.7 E-6	1.0 E-1	NA	NA	6.4 E-5	NA	NA
trichlorotrifluoroethane	0.0093	0.07245	680	19	2.3 E-2	3	30	6	540	3.5	3.7 E-5	3.0 E+1	NA	NA	1.2 E-6	NA	NA
methylene chloride	0.026	0.09181	680	19	2.9 E-2	3	30	6	540	3.5	4.7 E-5	9.0 E-2	1.6 E-3	3.5 E-3	5.0 E-4	9 E-9	2 E-8
cis-1,2-dichloroethene	0.024	0.09672	680	19	3.1 E-2	3	30	6	540	3.5	4.9 E-5	3.5 E-2	NA	NA	1.4 E-3	NA	NA
chloroform	0.0067	0.03325	680	19	1.1 E-2	3	30	6	540	3.5	1.7 E-5	3.0 E-3	8.1 E-2	1.9 E-2	5.4 E-3	2 E-7	4 E-8
1,1,1-trichloroethene	0.0033	0.0183	680	19	5.9 E-3	3	30	6	540	3.5	9.3 E-6	2.2 E+0	NA	NA	4.1 E-6	NA	NA
benzene	0.051	0.1656	680	19	5.3 E-2	3	30	6	540	3.5	8.5 E-5	3.0 E-2	2.7 E-2	1.0 E-1	2.7 E-3	3 E-7	1 E-6
trichloroethene	0.32	1.74345	680	19	5.6 E-1	3	30	6	540	3.5	8.9 E-4	3.5 E-2	4.0 E-1	7.0 E-3	2.4 E-2	4 E-5	7 E-7
toluene	0.035	0.134	680	19	4.3 E-2	3	30	6	540	3.5	6.8 E-5	4.0 E-1	NA	NA	1.6 E-4	NA	NA
chlorobenzene	0.028	0.13067	680	19	4.2 E-2	3	30	6	540	3.5	6.7 E-5	7.0 E-2	NA	NA	9.1 E-4	NA	NA
ethylbenzene	0.0074	0.03262	680	19	1.0 E-2	3	30	6	540	3.5	1.7 E-5	1.0 E+0	3.9 E-3	NA	1.6 E-5	8 E-9	NA
xylene	0.064	0.28275	680	19	9.1 E-2	3	30	6	540	3.5	1.4 E-4	1.0 E-1	NA	NA	1.4 E-3	NA	NA
1,3,5-trimethylbenzene	0.027	0.13421	680	19	4.3 E-2	3	30	6	540	3.5	6.9 E-5	6.0 E-3	NA	NA	1.1 E-2	NA	NA
1,2,4-trimethylbenzene	0.063	0.31477	680	19	1.0 E-1	3	30	6	540	3.5	1.6 E-4	6.0 E-3	NA	NA	2.6 E-2	NA	NA
1,3-dichlorobenzene	0.015	0.09161	680	19	2.9 E-2	3	30	6	540	3.5	4.7 E-5	2.0 E-1	NA	NA	2.2 E-4	NA	NA
1,4-dichlorobenzene	0.066	0.40239	680	19	1.3 E-1	3	30	6	540	3.5	2.1 E-4	8.0 E-1	2.2 E-2	4.0 E-2	2.5 E-4	5 E-7	1 E-6
1,2-dichlorobenzene	0.21	1.28	680	19	4.1 E-1	3	30	6	540	3.5	6.5 E-4	2.0 E-1	NA	NA	3.1 E-3	NA	NA
														Total[f]	0.09	4 E-5 2 E-6	3 E-6
OU C1/PRL 66B CatOx[g]					7.8 E-8	3	30	6	540	3.5	1.24 E-10	NA	1.5 E+5	1.3 E+5	NA	2 E-6	2 E-6
														Total[f]		4 E-5 4 E-6	5 E-6

dscfm = dry standard cubic feet per minute. dscmm = dry standard cubic meters per minute. Note: Unit Risk Factors (URF) are $(\mu g/m^3)$-1 and CSFs= URFx70 kgx1/20m^3/day

[a] effluent concentration (mg/m^3) x dcmm/60 sec/min

[b] assumes a dilution area 3 meters wide, 6 meters tall (based on SVE stack height of 20 feet), and 30 meters long. Nearest receptors to these SVE systems >30 meters away.

[c] Long term annual average for Sacramento, CA.

[d] Based on Hanna (1987) = Q x Cross wind width of source area (Width)/(Volume x wind speed)

[e] For noncarcinogens = concent. x 350 d/y x 6 yr/2190 days/RfC, for carcinogens = concent. x 20 m^3/d x 350 d/y x 30 yr/25550 days/70 kg x CSF

[f] USEPA cancer risk based upon the the proposed draft CSFs, and previous USEPA CSFs, respectively. Cal/EPA currently recommends not using the proposed EPA TCE CSF revision.

[g] From System Dioxin Risk Estimates.

Source: Quarterly Vadose Monitoring Report, First Quarter 2003, URS, 2003m

Table C-2

SVE System: VOC Emission Risk Estimates
Five-Year Review
Former McClellan AFB

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OU D- SVE System Emission Risk Estimates - 3/4/03

	Effluent Concentration		Effluent Flow		Chemical Flow (Q)	Dilution Area[b] Width	Length	Height	Volume	Wind speed[c]	Downwind concent.[d]	EPA RfC	EPA CSF	CalEPA CSF	EPA HI[e]	EPA Risk[e]	Cal/ EPA Risk[e]
Chemical	ppmv	mg/m^3	dscfm	dcmm	mg/sec[a]	m	m	m	m^3	m/s	mg/m^3	mg/m^3	$(mg/kg\text{-}d)^{-1}$	$(mg/kg\text{-}d)^{-1}$			
chloromethane	0.0095	0.01972	595	17	5.5 E-3	3	30	6	540	3.5	8.8 E-6	9.0 E-2	NA	NA	9.4 E-5	NA	NA
vinyl chloride	0.025	0.06496	595	17	1.8 E-2	3	30	6	540	3.5	2.9 E-5	1.0 E-1	3.1 E-2	2.7 E-1	2.8 E-4	1 E-7	9 E-7
1,1-dichloroethene	0.09	0.35625	595	17	1.0 E-1	3	30	6	540	3.5	1.6 E-4	2.0 E-1	NA	NA	7.6 E-4	NA	NA
trichlorotrifluoroethane	0.0073	0.05687	595	17	1.6 E-2	3	30	6	540	3.5	2.5 E-5	3.0 E+1	NA	NA	8.1 E-7	NA	NA
cis-1,2-dichloroethene	0.017	0.06746	595	17	1.9 E-2	3	30	6	540	3.5	3.0 E-5	3.5 E-2	NA	NA	8.3 E-4	NA	NA
chloroform	0.0052	0.02581	595	17	7.2 E-3	3	30	6	540	3.5	1.2 E-5	3.0 E-3	8.1 E-2	1.9 E-2	3.7 E-3	1 E-7	3 E-8
benzene	0.057	0.18509	595	17	5.2 E-2	3	30	6	540	3.5	8.3 E-5	3.0 E-2	2.7 E-2	1.0 E-1	2.6 E-3	3 E-7	1 E-6
trichloroethene	0.11	0.60087	595	17	1.7 E-1	3	30	6	540	3.5	2.7 E-4	3.5 E-2	4.0 E-1	7.0 E-3	7.4 E-3	1 E-5	2 E-7
chlorobenzene	0.0079	0.03697	595	17	1.0 E-2	3	30	6	540	3.5	1.7 E-5	7.0 E-2	NA	NA	2.3 E-4	NA	NA
1,3,5-trimethylbenzene	0.045	0.22368	595	17	6.3 E-2	3	30	6	540	3.5	1.0 E-4	6.0 E-3	NA	NA	1.6 E-2	NA	NA
1,2,4-trimethylbenzene	0.011	0.05496	595	17	1.5 E-2	3	30	6	540	3.5	2.5 E-5	6.0 E-3	NA	NA	4.0 E-3	NA	NA
1,3-dichlorobenzene	0.014	0.0855	595	17	2.4 E-2	3	30	6	540	3.5	3.8 E-5	2.0 E-1	NA	NA	1.8 E-4	NA	NA
1,4-dichlorobenzene	0.045	0.27435	595	17	7.7 E-2	3	30	6	540	3.5	1.2 E-4	8.0 E-1	2.2 E-2	4.0 E-2	1.5 E-4	3 E-7	6 E-7
1,2-dichlorobenzene	0.11	0.67048	595	17	1.9 E-1	3	30	6	540	3.5	3.0 E-4	2.0 E-1	NA	NA	1.4 E-3	NA	NA
dichlorodifluoromethane	0.0093	0.04675	595	17	1.3 E-2	3	30	6	540	3.5	2.1 E-5	2.0 E-1	NA	NA	1.0 E-4	NA	NA
tetrachloroethene	0.72	4.96	595	17	1.4 E+0	3	30	6	540	3.5	2.2 E-3	6.0 E-1	1.0 E-2	2.1 E-2	3.6 E-3	3 E-6	5 E-6
														Total[f]	0.04	2 E-5 4 E-6	8 E-6
OUD/IC19 CatOx[g]					4.2 E-9	3	30	6	540	3.5	6.64 E-12	NA	1.5 E+5	1.3 E+5	NA	1 E-7	1 E-7
														Total[f]		2 E-5 4 E-6	8 E-6

dscfm = dry standard cubic feet per minute. dscmm = dry standard cubic meters per minute. Note: Unit Risk Factors (URF) are $(\mu g/m^3)$-1 and CSFs= URFx70 kgx1/20m^3/day

[a] effluent concentration (mg/m^3) x dcmm/60 sec/min

[b] assumes a dilution area 3 meters wide, 6 meters tall (based on SVE stack height of 20 feet), and 30 meters long. Nearest receptors to these SVE systems >30 meters away.

[c] Long term annual average for Sacramento, CA.

[d] Based on Hanna (1987) = Q x Cross wind width of source area (Width)/(Volume x wind speed)

[e] For noncarcinogens = concent. x 350 d/y x 6 yr/2190 days/RfC, for carcinogens = concent. x 20 m^3/d x 350 d/y x 30 yr/25550 days/70 kg x CSF

[f] USEPA cancer risk based upon the the proposed draft CSF, and previous USEPA CSF, respectively. Cal/EPA currently recommends not using the proposed EPA CSF revision.

[g] From System Dioxin Risk Estimates.

Source: Quarterly Vadose Monitoring Report, First Quarter 2003, URS, 2003m

Table C-3

Preliminary Soil Gas Screening RAO Assessment
Five-Year Review
Former McClellan AFB

	Preliminary Screening Level		Screening Indoor Air Concentration		Inhalation Toxicity Criteria			Residential Risk/Hazard			Industrial Risk/Hazard		
					CSF		RfC						
	Residential	Industrial	Resident	Industrial	Cal/EPA	EPA	EPA	Cal/EPA	EPA	EPA	Cal/EPA	EPA	EPA
Contaminant	(ppmv)	(ppmv)	ug/m^3	ug/m^3	$(mg/kg\text{-}d)^{-1}$		(mg/m^3)	Risk	Risk	HI	Risk	Risk	HI
1,1-Dichloroethane	2.3	28	26.9	8.6	6 E-3	NA	5 E-1	2 E-5	NA	0.0527	3 E-6	NA	0.012
1,1-Dichloroethene	0.13	1.3	1.5	0.4	NA	NA	2 E-1	NA	NA	0.0073	NA	NA	0.001
1,2- Dichloroethane	0.07	1.2	0.8	0.4	7 E-2	9 E-2	5 E-3	7 E-6	9 E-6	0.16	2 E-6	2 E-6	0.051
1,4-dichlorobenzene	0.11	1.9	1.9	0.9	4 E-2	2 E-2	8 E-1	9 E-6	5 E-6	0.0023	2 E-6	1 E-6	0.001
acetone	160	6300	1126	1135	NA	NA	4 E-1	NA	NA	3.1	NA	NA	2.2
Benzene	0.15	1.9	1.4	0.5	1 E-1	3 E-2	3 E-2	2 E-5	4 E-6	0.0446	3 E-6	9 E-7	0.010
carbon tetrachloride	0.09	0.96	1.6	0.5	2 E-1	5 E-2	2 E-3	3 E-5	1 E-5	0.642	5 E-6	2 E-6	0.128
chlorobenzene	11	230	146.4	80.1	NA	NA	7 E-2	NA	NA	2.0	NA	NA	0.783
Chloroform	0.43	5.9	6.1	2.2	2 E-2	8 E-2	3 E-3	1 E-5	6 E-5	2.0	3 E-6	1 E-5	0.496
cis-1,2- Dichloroethene	28	540	321	162	NA	NA	4 E-2	NA	NA	8.8	NA	NA	3.17
Methylene Chloride	2.9	42	29	11.0	4 E-3	2 E-3	9 E-2	1 E-5	6 E-6	0.314	3 E-6	1 E-6	0.084
Tetrachloroethene	0.5	5.5	9.8	2.8	2 E-2	1 E-2	6 E-1	2 E-5	1 E-5	0.0158	4 E-6	2 E-6	0.003
Trichloroethene (TCE)	1.1	12	17.1	4.9	7 E-3	4 E-1	4 E-2	1 E-5	8 E-4	0.470	2 E-6	1 E-4	0.095
toluene	310	6300	3400	1797	NA	NA	4 E-1	NA	NA	8.2	NA	NA	3.08
trans-1,2- Dichloroethene	78	1300	893	390	NA	NA	7 E-2	NA	NA	12.2	NA	NA	3.81
Vinyl Chloride	0.13	1.3	1.0	0.3	3 E-1	3 E-2	1 E-1	3 E-5	4 E-6	0.0093	5 E-6	5 E-7	0.002
freon 113	NA	NA	NA	NA	NA	NA	3 E+1	NA	NA	NA	NA	NA	NA
1,2-dichloropropane	NA	NA	NA	NA	4 E-2	7 E-2	4 E-3	NA	NA	NA	NA	NA	NA
1,2-dichlorobenzene	NA	NA	NA	NA	NA	NA	2 E-1	NA	NA	NA	NA	NA	NA
1,2,4-trichlorobenzene	NA	NA	NA	NA	NA	NA	2 E-1	NA	NA	NA	NA	NA	NA
1,1,1 - Trichloroethane	NA	NA	NA	NA	NA	NA	2 E+0	NA	NA	NA	NA	NA	NA
1,1,2 - Trichloroethane	NA	NA	NA	NA	6 E-2	6 E-2	1 E-2	NA	NA	NA	NA	NA	NA
ethylbenzene	NA	NA	NA	NA	NA	NA	1 E+0	NA	NA	NA	NA	NA	NA
styrene	NA	NA	NA	NA	NA	NA	1 E+0	NA	NA	NA	NA	NA	NA
freon 11	NA	NA	NA	NA	NA	NA	7 E-1	NA	NA	NA	NA	NA	NA
xylenes	NA	NA	NA	NA	NA	NA	1 E-1	NA	NA	NA	NA	NA	NA
							Total[a]	2 E-4	9 E-4 1 E-4	37.9	3 E-5	2 E-4 2 E-5	13.9

[a] The cancer risks presented here include those associated with the proposed revised CSF and the previous USEPA CSF, respectively.

Note: Unit Risk Factors (URF) are $(\mu g/m^3)$-1 and CSFs= URFx70 kgx1/20m^3/day

Table C-4

GWTP System: VOC Emission Risk Estimates
Five-Year Review
Former McClellan AFB

Chemical	Effluent Concentration ppbv[a]	Effluent Concentration mg/m^3	Effluent Flow dscfm[b]	Effluent Flow dcmm	Chemical Flow (Q) mg/sec[c]	Dilution Area[d] Width m	Length m	Height m	Volume m^3	Wind speed[e] m/s	Downwind concent.[f] mg/m^3	EPA RfC mg/m^3	EPA CSF (mg/kg-d)$^{-1}$	CalEPA CSF (mg/kg-d)$^{-1}$	EPA HI[g]	EPA Risk[g]	Cal/ EPA Risk[g]
freon 12	0.42	0.0021	12529	355	1.2 E-2	3	30	6	540	3.5	2.0 E-5	0.7	NA	NA	2.7 E-5	NA	NA
carbon tetrachloride	0.42	0.00268	12529	355	1.6 E-2	3	30	6	540	3.5	2.5 E-5	0.00245	0.0525	0.15	9.9 E-3	2 E-7	4 E-7
chloromethane	0.42	0.00088	12529	355	5.2 E-3	3	30	6	540	3.5	8.3 E-6	9.0 E-2	NA	NA	8.8 E-5	NA	NA
1,1-dichloroethane	0.42	0.002	12529	355	1.0 E-2	3	30	6	540	3.5	1.6 E-5	0.49	NA	5.7 E-3	3.2 E-5	NA	NA
1,1-dichloroethene	3.2	0.013	12529	355	7.6 E-2	3	30	6	540	3.5	1.2 E-4	2.0 E-1	NA	NA	5.8 E-4	NA	NA
tetrachloroethylene	0.42	0.003	12529	355	1.7 E-2	3	30	6	540	3.5	2.7 E-5	6.0 E-1	1.0 E-2	2.1 E-2	4.4 E-5	3 E-8	7 E-8
methylene chloride	1.3	0.005	12529	355	2.7 E-2	3	30	6	540	3.5	4.3 E-5	9.0 E-2	1.6 E-3	3.5 E-3	4.6 E-4	8 E-9	2 E-8
cis-1,2-dichloroethene	6.6	0.027	12529	355	1.6 E-1	3	30	6	540	3.5	2.5 E-4	3.5 E-2	NA	NA	6.9 E-3	NA	NA
chloroform	1.4	0.007	12529	355	4.1 E-2	3	30	6	540	3.5	6.5 E-5	3.0 E-3	8.1 E-2	1.9 E-2	2.1 E-2	6 E-7	1 E-7
trichloroethene	11	0.060	12529	355	3.5 E-1	3	30	6	540	3.5	5.6 E-4	3.5 E-2	4.0 E-1	7.0 E-3	1.5 E-2	3 E-5	5 E-7
toluene	0.42	0.002	12529	355	9.5 E-3	3	30	6	540	3.5	1.5 E-5	4.0 E-1	NA	NA	3.6 E-5	NA	NA
xylene	0.42	0.002	12529	355	1.1 E-2	3	30	6	540	3.5	1.7 E-5	1.0 E-1	NA	NA	1.7 E-4	NA	NA
														Total[h]	0.04	3 E-5 1 E-6	7 E-7

dscfm = dry standard cubic feet per minute. dscmm = dry standard cubic meters per minute.

[a] As reported in the analytical laboratory report and URS, 2003. Conversion to mg/m^3 completed using converter on http://www.airtoxics.com/cclasses/unitcalc.html

[b] As reported in the McClellan Groundwater Treatment Facilities Monthly Operations/Status Report, URS 2003o.

[c] effluent concentration (mg/m^3) x cmm/60 sec/min

[d] assumes a dilution area 3 meters wide, 6 meters tall (based on stack height of 20 feet), and 30 meters long. Nearest receptors to these GWTP systems >30 meters away.

[e] Long term annual average for Sacramento, CA.

[f] Based on Hanna (1987) = Q x Cross wind width of source area (Width)/(Volume x wind speed)

[g] For noncarcinogens = concent. x 350 d/y x 6 yr/2190 days/RfC, for carcinogens = concent. x 20 m^3/d x 350 d/y x 30 yr/25550 days/70 kg x CSF

[h] USEPA cancer risk based upon the the proposed draft CSF, and previous USEPA CSF, respectively. Cal/EPA currently recommends not using the proposed EPA CSF revision.

Table C-5

GWTP System: Non-VOC Emission Risk Estimates
Five-Year Review
Former McClellan AFB

Chemical	Date Last Sampled	Chemical Flow lb/hr	Chemical Flow mg/hr	Chemical Flow (Q) mg/sec[a]	Dilution Area[b] Width m	Length m	Height m	Volume m^3	Wind speed[c] m/s	Downwind concent.[d] (Ca) mg/m^3	EPA RfC mg/m^3	EPA CSF $(mg/kg\text{-}d)^{-1}$	CalEPA CSF $(mg/kg\text{-}d)^{-1}$	EPA HI[e]	EPA Risk[e]	Cal/ EPA Risk[e]
Diox/Fur (TCDD Equiv.)	3/17/2003	1.9 E-10	8.6 E-5	2.4 E-8	3	30	6	540	3.5	3.8 E-11	NA	1.5 E+5	1.3 E+5	NA	7 E-7	6 E-7
											Air Quality Standard[f]			Ca/AQS[g]		
HCL	3/28/2003	0.012	5.4 E+3	1.5 E+0	3	30	6	540	3.5	2.4 E-3	9.0 E-3	NA	NA	2.7 E-1		
HF	3/28/2003	0.007	3.3 E+3	9.2 E-1	3	30	6	540	3.5	1.5 E-3	2.5 E+0	NA	NA	5.9 E-4		
PM	7/30/2002	0.26	1.2 E+5	6.6 E+0	3	30	6	540	3.5	1.0 E-2	2.0 E-2	NA	NA	5.2 E-1		
NOx	7/29/2002	<0.087	NA	NA	3	30	6	540	3.5	NA	NA	NA	NA	NA		
CO	7/29/2002	0.14	6.3 E+4	1.8 E+1	3	30	6	540	3.5	2.8 E-2	1.1 E+1	NA	NA	2.7 E-3		
SOx	7/29/2002	<0.25	NA	NA	3	30	6	540	3.5	NA	NA	NA	NA	NA		

[a] emission rate (lb/hr)x 0.45 kg/lb x 10^6 mg/kg / 1000 mg/µg/3600 sec/min. For particulate matter (PM), conservatively assumes approximately 20% of the total PM is PM10.

[b] assumes a dilution area 3 meters wide, 6 meters tall (based on stack height of 20 feet), and a 30 meters distance to the nearest downwind receptor.

[c] Long term annual average for Sacramento, CA.

[d] Based on Hanna (1987) = Q x Cross wind width of source area (Width)/(Volume x wind speed)

[e] For noncarcinogens = concent. x 350 d/y x 6 yr/2190 days/RfC, for carcinogens = concent. x 20 m^3/d x 350 d/y x 30 yr/25550 days/70 kg x CSF

[f] Available air quality standards for each constituent. HCL = OEHHA Chronic REL; HF = NIOSH 10 hr REL; PM = PM10 annual CAAQS; CO = primary 8 hour average CAAQS.

[g] Ca/AQS is the ratio of the estimated downwind concentration to the available air quality standard (AQS) for the constituent. A ratio > 1.0 would indicate an exceedance of the AQS.

Table C-6

GWTP Effluent Evaluation
Five-Year Review
Former McClellan AFB

(Page 1 of 2)

Discharge Analytes	California Toxics Rule[a] Freshwater Aquatic Criterion Max. Conc.	California Toxics Rule[a] Freshwater Aquatic Criterion Continuous Conc.	USEPA Tapwater PRG[l]	Discharge Limit[b] Daily Maximum	Discharge Limit[b] Monthly Average	QAAP MDL[k] Min	QAAP MDL[k] Max	GWTP Effluent 7/2003[f]	GWTP Effluent 6/2003[f]	GWTP Effluent 5/2003[g]	GWTP Effluent 1/2003[h]	Notes
1,1-Dichloroethane	NA	NA	2	1.0[c]	--	0.036	1.21	NA	ND	ND	NA	i
1,2-Dichloroethane	NA	NA	0.12	1.0[c]	--	0.035	0.65	NA	ND	ND	NA	
1,1-Dichloroethene	NA	NA	340	1.0[c]	--	0.072	1.96	NA	ND	ND	NA	i
cis-1,2-Dichloroethene	NA	NA	61	1.0[c]	--	0.038	0.97	NA	ND	ND	NA	
Tetrachloroethene	NA	NA	0.66	1.0[c]	--	0.052	1.22	NA	ND	ND	NA	i
Trichloroethene	NA	NA	0.03	1.0[c]	--	0.022	0.321	NA	ND	ND	NA	
1,1,1-Trichloroethane	NA	NA	3200	1.0[c]	--	0.016	0.412	NA	ND	ND	NA	
Vinyl Chloride	NA	NA	0.02	1.0[c]	--	0.064	1.68	NA	ND	ND	NA	i
Alpha-BHC	NA	NA	0.01	<ML[d]	--	0.0012	0.02	<0.0075	NA	NA	<0.0075	
Gamma-BHC	0.95	NA	0.052	<ML[d]	--	0.0013	0.03	<0.0066	NA	NA	<0.0066	
Beta-BHC	NA	NA	0.037	<ML[d]	--	0.0008	0.02	<0.012	NA	NA	<0.012	
Heptachlor	0.52	0.0038	0.015	<ML[d]	--	0.00095	0.02	<0.0075	NA	NA	<0.0075	i, j
Delta-BHC	NA	NA	--	<ML[d]	--	0.00076	0.03	<0.011	NA	NA	<0.011	
Aldrin	3	NA	0.004	<ML[d]	--	0.00097	0.03	<0.01	NA	NA	<0.01	
Heptachlor Epoxide	0.52	0.0038	0.007	<ML[d]	--	0.001	0.015	<0.0047	NA	NA	<0.0047	i, j
Alpha-Chlordane	2.4	0.0043	0.19	<ML[d]	--	0.0077	0.034	<0.0047	NA	NA	<0.0047	i, j
Gamma-Chlordane	2.4	0.0043	0.19	<ML[d]	--	0.0077	0.034	<0.0047	NA	NA	<0.0047	i, j
Endosulfan	0.22	0.056	220	<ML[d]	--	0.0011	0.01	<0.0072	NA	NA	<0.0072	
DDE	NA	NA	0.2	<ML[d]	--	0.002	0.05	<0.028	NA	NA	<0.028	
Dieldrin	0.24	0.056	0.004	<ML[d]	--	0.0023	0.02	<0.021	NA	NA	<0.021	
Endrin	0.086	0.036	11	<ML[d]	--	0.0037	0.031	<0.0094	NA	NA	<0.0094	
DDD	NA	NA	0.28	<ML[d]	--	0.002	0.05	<0.023	NA	NA	<0.023	
DDT	1.1	0.001	0.2	<ML[d]	--	0.002	0.043	<0.013	NA	NA	<0.013	i, j
Endrin Aldehyde	NA	NA	--	<ML[d]	--	0.0042	0.062	<0.0094	NA	NA	<0.0094	
Endosulfan Sulfate	NA	NA	--	<ML[d]	--	0.0029	0.03	<0.01	NA	NA	<0.01	
Methoxychlor	NA	NA	180	<ML[d]	--	0.012	0.254	<0.055	NA	NA	<0.055	
Toxaphene	0.73	0.0002	0.06	<ML[d]	--	0.053	1.4	<1.2	NA	NA	<1.2	i, j

APPENDIX D

RESPONSES TO COMMENTS

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
DTSC GENERAL COMMENTS (DATED 21 OCTOBER 2003)						
1.				DTSC (Kevin Depies)	The California Fish and Game has completed a brief review with a focus on ecological issues and have no comments on the Review.	The comment has been noted and a response is not necessary.
2.					Several years ago the Air Force initiated a domestic well abandonment program to limit the potential for human exposure to contaminated groundwater for residents in the area west and southwest of the base. These residences were connected to city and community well supplies and connections of their domestic wells were severed from their houses. Not all homeowners wanted their wells abandoned and so not all wells were abandoned. Homeowners that chose to not have their wells abandoned were instructed to not use their wells for domestic purposes. We believe it appropriate for the 5-Year Review to include an evaluation as to whether any of these homeowners are using their wells for domestic purposes. This means identifying offbase groundwater contamination areas (these are really limited due to the successful groundwater extraction program), determining if domestic wells are still present in these areas, and verifying with these homeowners that they are not using these wells for domestic purposes.	Although it is beyond the scope of this Five-Year Review to conduct an assessment of homeowners who are using their wells for domestic purposes, this Draft Final Five-Year Review (Section 4.5.5 on Page 4-16 and Section 4.6 on Page 4-31) includes a recommendation that the Air Force issue a letter to the County Health Department to request that they conduct an outreach program to identify those homeowners within the area of off-base contamination who still have groundwater wells and are using those wells for domestic purposes. It is intended that appropriate actions, including possible well abandonment, will result from this outreach program.
3.					The conventional way for reporting references includes identifying the date the referenced document was published. At a minimum, the month and year should be identified. Many of the references are lacking this information.	Information from other contractors referenced in the text is presented according to McClellan's current guidelines and is in agreement with other documents contractors and the Air Force have recently issued. The Reference Section has been updated to provide month and year information, where possible.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
4.					Because of staff resource limitations, we have deferred to the U.S. EPA our review of the risk assessment information provided in the Review. After taking this action, we noted that the Review contains McAFBs newest shallow soil gas risk assessment procedures and methods that are being developed at McAFB. This is the first document produced by McAFB that contains these procedures which we expect will be also be presented in the upcoming shallow soil gas RICS and shallow soil gas FS addendum to the VOC FS. Since we are not reviewing these sections of the Review, we believe it worthwhile to inform the Air Force that concurrence with the Review does not necessarily correlate to concurrence with the risk assessments methods/procedures provided in the Review; and we will provide comments on these in the upcoming RICS and FS Addendums.	The risk assessments presented in the Five-Year Review Report represent screening level analyses that use very conservative assumptions to evaluate whether ongoing remedial activities may affect public health or the environment. The formulae and approaches used for the Five-Year Review screening evaluations are current state-of-the-practice, but they are not designed or intended to replace more detailed approaches that are being developed for the shallow soil gas RICS and the shallow soil gas FS addendum to the VOC FS. As a result, the Air Force understands that regulatory concurrence with the Five-Year Review soil gas screening evaluation does not necessarily imply an acceptance of methods or procedures that may influence more detailed deliberations for the RICS and FS Addendum.
5.					The Review repeatedly states that risk estimates for individual chemicals are within the 'acceptable risk range of 10^{-4} to 10^{-6}' implying that this is the 'end-point' for whether action is needed or cleanup may cease. It needs to include a discussion of the agreement between McAFB and the regulators that the need for cleanup; or the continuation of cleanup is based on the cumulative risk and that each chemical for each exposure pathway needs to be at or below $1x10^{-6}$ for no action or the cessation of action to happen.	The text in the Executive Summary (Page ES-2) and Section 1.4 (Page 1-6) has been modified to clarify the use of the 'acceptable risk range of 10^{-6} to 10^{-4} in terms of the screening evaluations for the Five-Year Review Report. For the Five-Year Review, this acceptable risk range (i.e. 10^{-6} to 10^{-4}) has been used to assess the potential impact to public health or the environment from ongoing remedial activities at McClellan. As such, the use of this risk range is not intended to imply that a site-specific cleanup level has been achieved, or that the screening evaluation is establishing a risk-based cleanup level. McClellan intends that all cleanup levels will be developed according to the appropriate CERCLA decision document process and with concurrence of the State and Federal Remedial Project Managers.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
6.					The Review casually interchanges "removal action" and "remedial action" at various places in the text (i.e., Section 6.3 title and subsequent text in 3rd paragraph of Section 6.3). Change the text so that terms are used correctly as defined in the NCP.	The text has been searched and corrected in accordance with the accepted terms (either "removal" or "remedial" action) for each of the sites. The use of the terms "removal action" and "remedial action" has been compared to the USEPA definitions: "**Removal actions** are immediate, short-term responses intended to protect people from immediate threats posed by hazardous waste sites. Examples of removal actions are excavating contaminated soil, erecting security fences or stabilizing a berm, dike or impoundment. Removal actions may also include taking abandoned drums to a proper disposal facility to prevent the release of hazardous substances into the environment. Removal actions may occur an NPS or non-NPL sites". "**Remedial actions** are long-term cleanups designed to prevent or minimize the release of hazardous substances and to reduce the risk and danger to public health or the environment. Remedial actions (RA) follow the remedial design (RD) phase of the Superfund cleanup process and are a part of the actual construction or implementation phase of the cleanup. The RD/RA is based on the cleanup specifications described in the Record of Decision (ROD)." This term was corrected in the text throughout Sections 6 and 8.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
7.	12				Section 12 omits an extremely important land use control that is occupying considerable McAFB and regulator resources as we attempt to complete RODs and transfer property. This is the state Land Use Covenant regulation. Add information on this issue to Section 12.	The text in Section 12.5 on Page 12-16 has been modified to include the following descriptions of State Land Use Covenants: "Before transfer of title to the property including one or more of the sites at which ICs are selected, the Air Force will execute a State Land Use Covenant (SLUC) that includes legal descriptions of affected areas. The SLUC will be recorded before the recording of the federal deed. The State will enter into the SLUC pursuant to State law, including the California Code of Regulations, Title 22, Section 67391.1. The SLUC will be based on the model Covenant to Restrict Use of Property developed by DTSC. Modifications or termination of the SLUC must be undertaken in accordance with State law, CERCLA, the NCP, and the IRP."

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
8.					We were unable to locate any text or conclusions discussing a review of current laws and regulations that may have been implemented since the last review that could impact the remedies in place.	Appendix C (Pages C-2 through C-9) has been modified to include a short summary of changes in standards, methodologies, and toxicity criteria during the last five years that were used in this evaluation and may affect the protectiveness of the remedies in place. As described in the Final Work Plan for Five-Year Review, the approach has been to review the changes in standards and toxicity for the primary list of contaminants of concern (COCs) occurring at McClellan over the last five years and determine those sites and remedial actions (systems) where performance and protectiveness might be affected. If required, the preliminary screening has been carried out on those sites where threshold, toxicity or cleanup standards have changed to determine if more detailed studies should be recommended. Those changes are most comprehensively discussed in Appendix C, Health Risk Review Detail, for the vadose zone, groundwater, and radiological issues at McClellan. Since many of the earlier remedial actions at McClellan were presumptive remedies that were implemented under a wide range of decision documents and remedial action objectives (RAOs), it was not considered to be effective or practical to completely analyze potential ARARs. A comprehensive description of potential ARARs for McClellan is included in the Draft Basewide Remedial Investigation Report, Part 1 General Framework (URS, 2002f, Appendix F). Moreover, extensive ARARs analyses are being or will be conducted for the twelve additional FSs and RODs scheduled at McClellan (not counting the Davis ROD or the No Action ROD).

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
9.					The Review fails to discuss potential air emissions issues from the VOC groundwater and soil gas remedies. Air emissions ARARs should be assessed and remedy protectiveness evaluated.	Air emissions from the Groundwater Treatment Plant are discussed in Appendix C (Page C-22) and summarized in Section 4.5.5, Subsection Human Health Screening Assessment (Page 4-21). Air emissions from the Vadose Zone systems are discussed in Appendix C (Page C-10) and summarized in Section 5.5.5 (Page 5-10).
DTSC SPECIFIC COMMENTS (DATED 21 OCTOBER 2003)						
1.		1-5	1st Pgph, 5th Line	DTSC (Kevin Depies)	The Air Force needs to further consider and discuss that risk assessment methods at McAFB have changed in the 5 years since the last review was completed. The document should briefly summarize any of these changes.	Appendix C has been modified to include a short summary of the changes to risk assessment methods employed at McClellan over the last five years. As noted in the Response to General Comment No. 8 above, Appendix C (Pages C-2 through C-9) provides the best summary of methods that are being applied since the last Five-Year Review.
2.		3-3	2nd Pgph, 1st Sentence		The text indicates that reuse is dictating the CERCLA investigation and site cleanup. It should further convey that this is not compromising safety and cleanup has occurred or is underway for the most significant contamination that threatened or threatens public safety.	Text in Section 3.1, Page 3-3 has been modified to include the following text: "It should be noted that even though future land use is the primary consideration for prioritizing cleanup, safety has not been compromised and cleanup has occurred or is underway for the most significant contamination that threatened or threatens public safety."
3.	4.1	4-1	2nd Pgph., 3rd Sentence		This sentence is contradicted by the 5th sentence in this paragraph. We suggest you modify the 3rd sentence to state that groundwater declined for approximately 50 years, but has since stabilized, or something similar.	The sentence in Section 4.1 on Page 4-1 has been modified as suggested "The water level within the aquifer system has been dropping continuously for approximately 50 years (CH2M Hill, 1995, p. 25) but has since stabilized." Please also see Response to EPA – TLI Specific Comment No. 2.
4.		4-2	2nd Pgph, 1st Sentence		Begin this sentence with the word "General" or "Regional".	The sentence on Page 4-2 has been modified as suggested to 'Regional'.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
5.		4-4	3rd Pgph, 2nd Sentence		It is our understanding that the purpose of the cap was to limit the infiltration of surface water/precipitation and to control off-gas emissions as stated in the 5th sentence of paragraph 2 on page 7-3. Revise the text accordingly.	The text on Page 4-4 has been modified as suggested: "An interim remedial action (engineered cap) was performed at OU D to limit the infiltration of surface water/precipitation and to control off-gas emissions."
6.		4-5	3rd Pgph, 5th Sentence		So that it doesn't come off as possible bewilderment on the part of McAFB or the regulators, we recommend that the following be inserted at the end of the sentence "although suspected source areas have been identified".	The suggested wording has been added to Page 4-5: "As yet, no specific source of hexavalent chromium contamination at McClellan has been found, although suspected source areas have been identified."
7.		4-7	2nd Pgph		The many exceedences of MCLs and background levels for metals in groundwater appear potentially alarming. We strongly recommend that this revelation factor into future program prioritization (and associated program funding).	The Air Force is aware of this issue and has taken appropriate action for funding and program prioritization. No changes were made to the text.
8.	4.5.1	4-12	Bullet List		It is unclear if the "Change Pages to the GWM Plan" was reviewed as it isn't identified in the list. If not reviewed, then the pages should be reviewed. If it was reviewed, then this should be indicated in the bullet list.	During preparation of the Draft Final Five-Year Review Report, the 'Final Change Pages to the Groundwater Monitoring Plan' were reviewed. The reference has been added to the bullet list on Page 4-13 and the list of references located at the back of the text on Page R-9.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
9.		4-15	3rd Pgph		DTSC has anecdotal evidence that this IC is not working at protecting residents. One resident last year complained he was never informed of this restriction upon purchase of his house and has regularly used the water to fill his swimming pool. The use may not pose a significant risk; but the lack of the information being conveyed to the homeowner indicates a flaw in the IC. Another nearby home renter noted to DTSC that her child periodically drank from the spigot of the domestic well on their property. Neither resident were in areas known to contain contaminated groundwater. However, the incidences indicates a more rigorous method of preventing these occurrences needs to be identified and implemented, if feasible. This may be done through a joint McAFB and regulator (and possibly public or private water purveyor) effort towards periodically informing nearby residents of these restrictions.	Please refer to the Response to General Comment No. 2.
10.		4-18	Last Pgph		Please update the text to reflect that the QAPP was revised in 2003. Additionally, the 1999 version is inappropriate to use as it never was finalized due to conflicts between McAFB and the regulators.	The text on Page 4-19 and the bullet list on Page 4-13 have been updated to reflect that the QAPP was revised; the text references the latest version of the QAPP that was available as of 18 August 2003 (Draft Final, Version 5, July 2003).
11.		4-23	1st Sentence		Update the text to reflect the recent finalization of the QAPP.	The text on Page 4-23 has been updated to reference the most recent version of the QAPP that was available as of 18 August 2003. Please also see Response to Specific Comment No. 10 above.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
12.		4-23	Last Pgph		The document should briefly discuss the current Creeks RI and how there has been some concern raised that humans could be impacted by consuming fish caught from Magpie Creek.	DTSC, Human and Ecological Risk Division (HERD), has raised concerns about the contamination of creek sediments. The following text has been added to Section 13.3, Page 13-4: "In addition, DTSC/HERD performed preliminary calculations based on sediment results, demonstrating potential risk to human health from fish consumption." This issue is currently being addressed through the data gap assessment and Ecological Sites FS. It should be noted that interim actions being taken to control existing exposure pathways include placement of "no trespassing" and "no fishing" signs in the West Nature Area. No text changes have been made to Section 4, since this issue is not related to the protectiveness of McClellan's Groundwater Treatment Plant effluent.
13.		4-26	Last Sentence		The document makes a broad statement that all the third party issues have been addressed, but fails to give specifics. At a minimum, the document should point the reader to where the details are published so the reader can confirm that all the issues have been addressed.	There is no single published document that addresses all third party comments in their entirety. However, the Five-Year Review Report text in Section 4.5.5 that summarizes the various review comments by Clearwater Revival Company and PM Strauss & Associates (Pages 4-27 through 4-29) has been modified to include references to the appropriate Phase III off-base investigation results, progress on groundwater modeling, groundwater monitoring plan updates, and quarterly reports that address the nature of the comment or concern.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
14.		4-27	2nd Pgph, Last Sentence		Similar to above Specific Comment 13, the text does not provide backup for the conclusion that all the issues have been addressed. In particular, no changes in the program were made to address Issue 2; so an explanation needs to be given how Issue 2 was addressed.	Please see the Response to Specific Comment No. 13 above. The substantive issue raised by Clearwater Revival Company in 'Issue 2', i.e., clear definition of off-base plume boundaries within a single sampling quarter, has been addressed by the results of the Phase III Off-Base Data Gaps program, and groundwater concentrations in the off-base areas will be monitored frequently as part of the initial Phase III expansion of the Groundwater Treatment Plant, which will focus on the capture of off-base plumes. The text on Pages 4-27 to 4-29 has been revised to include these conclusions.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
15.	6.5.2	6-6			Although the Review states that the June 2003 Quarterly (1Q03) Inspection Report was reviewed; critical information on the detection of PCBs in the unlined OU B1 drainage ditch presented in the 1Q03 report is not discussed. Add this information to the Review. Furthermore, update the text to reflect the latest information for the OU B1 drainage ditch cleanup work.	The results from the First Quarter 2003 inspection and the subsequent removal of sediments in the unlined ditch are presented in Section 6.3, Page 6-3, 2nd and 3rd Paragraphs. The text in Section 6.3 on Page 6-4 has been modified: "During the First Quarter 2003 inspection, low concentrations of PCBs (1.1 mg/kg) were also detected in a sample collected from the section of unlined ditch adjacent to the southeast corner of the OU B1 Cap (Figure 6-1). In accordance with the protocol, a complete suite of analyses was conducted for the other COCs and resulted in no detections. Additional samples were collected to determine the extent of residual PCB contamination and an additional six inches of soil were excavated in July 2003 from this 1000-ft long section of the ditch on the south-side of the OU B1 Cap (near Building 700). Confirmation samples indicated the remaining soils were below the cleanup levels. No COCs were detected in other sections of the unlined ditch during the First Quarter 2003 inspection. All of the unlined sections were backfilled with clean soil in October 2003, and a new sediment trap was installed in November 2003 between the OU B1 Cap and the unlined section of the ditch immediately south of the cap. This sediment trap was installed to allow future monitoring of sediment runoff from the southeast portion of the OU B1 Cap and to protect the downstream section of unlined ditch from receiving contaminated sediments. In the future, this sediment trap will be sampled at the same time the two previously existing OU B1 sediment traps are sampled."

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15. Cont'd						Also, Section 6.5.2 on Page 6-7 has been modified to the following: "Confirmation samples collected as part of the removal of the contaminated soil and sediment in the drainage ditches in 2002 and 2003 indicated that all soils contaminated with PCBs or other COCs above the cleanup level were removed from the unlined sections of the drainage ditch."
16.		6-9	1st Pgph		The paragraph should provide a brief mention of the basis for the inorganic interim removal goals. It was not simply to cleanup to background or the detection limit as implied by the text.	The inorganic interim removal goals were based on background levels established in the General Framework Document (URS, 2002f) and this statement has been added to the text on Page 6-11. The text in Section 6.5.5 on Page 6-11 has been further modified to provide the following explanation: "Because the initial assessment assumed removal of only the upper six inches (i.e., sediments), background levels of inorganics in sediments were selected as the basis for removal goals. During the drainage ditch remedial action, however, two feet of soils were removed, resulting in an excavation bottom in the native soils, which in this case are predominantly silts and clays. Therefore, established background levels of inorganics in silt and clays were considered more appropriate removal goals."

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
17.		6-12	1st Pgph		With the detection of PCBs in the unlined OU B1 drainage ditch, we believe it would be prudent to also periodically collect soil samples (possibly semiannually) from the ditch.	At this point in time, the Air Force does not consider additional soil sampling from the ditch necessary for the following reasons: 1) All contaminated soils/sediments have been removed from the ditch and the most recent confirmation samples indicated 'Non-Detect' values for all COCs. 2) The ditch has since been backfilled with at least two feet of clean imported soil. 3) The Air Force continues to conduct quarterly inspections of the drainage ditches, including seasonal sampling of the sediment traps. If concentrations of COCs in the sediment samples exceeded the cleanup levels, the Air Force would take further action to identify and isolate the source(s) of that contamination. LUC/ICs have been implemented for the lined part of the drainage ditch, including monitoring and maintenance along with deed restrictions.
18.	7.2	7-2	2nd Pgph, 5th Sentence		To avoid the need for a lengthy discussion about the uncertainties over McAFB radiation background levels, we believe the text should be revised to state that surface soil radiation levels were found to be consistent with background levels established at the time of the investigation.	The text has been modified as suggested. The sentence in Section 7.2 on Page 7-3 now reads: "Results from this investigation concluded that surface soil radiation levels were consistent with background levels established at the time of the investigation."
19.		7-7	3rd Pgph, Last Sentence		Considering the nature and extent of contamination, the likelihood of cap damage, and limitations on site oversight; we don't believe OU D is suitable for industrial or commercial use as indicated in this sentence.	The text in Section 7.5.5 regarding the land use of the OU D Cap was not intended to imply that the cap was suitable for construction activities. The Air Force will ensure appropriate restrictions are in place to prevent exposure with the current and intended future land use of 'light industrial'. The following text has been added to Section 7.5.5, Pages 7-7 and 7-8:"…The OU D Cap is considered protective as long as …4) land use continues to be restricted, and appropriate restrictions are in place to prevent exposure."

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
20.		7-7	"Ecological Evaluation"		The evaluation should discuss the potential for burrowing animals to be exposed to contamination; or measures undertaken by McAFB to limit this potential exposure.	The risk for burrowing animals to be exposed to contamination at the OU D Cap is considered minimal. The cap consists of five layers, which include granular fill, six inches of sand and gravel, 18 inches of compacted clay, a 40-mil plastic membrane, and two to three feet of imported top soil. The cap is also covered with grasses and bare soil. Furthermore, the Air Force is conducting quarterly inspections of the cap that include an evaluation for burrowing animals. These regular inspections also mitigate any potential exposure.
21.	8.2 and 8.3	8-3			We suggest that the authors re-review the PRL S-033 documents. Contrary to what is indicated in the Review, 1999 U.S. EPA PRGs were not selected as the cleanup levels for the PRL S-33 remedial action. Furthermore, the activity performed was a "Removal Action", not a "Remedial as indicated in the title for Section 8.3.	The title for Section 8.3 on Page 8-4 has been changed to 'Removal Action', as requested. Furthermore, a global search was conducted to replace the term 'Remedial' with 'Removal' in Section 8. [Page 8-4] The text in Section 8.2 on Page 8-3 has been modified for clarification: "The PRGs address these exposure pathways and were used as health-based levels to develop preliminary cleanup goals for the protection of human health. Because the PRGs do not include the exposure pathway for homegrown produce and the cumulative risk of multiple COCs, they were used only as guides to determine the initial volume of contaminated soil that had to be removed. Once the removal action was complete, confirmation soil samples were collected. Upon verification that residential PRGs were achieved through sampling and analysis of residual soil, the cumulative residual risk from PAHs was calculated using this analytical data (Roy F. Weston, 2002a, p. 15)."

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22.	9.2	9-2	Last Pgph		As the information provided in the text is written in the present tense, it indicates that the radium contamination is still present at the site. Yet, subsequent text on Page 9-3 discusses the removal action conducted in 2002. Please clarify this apparent discrepancy.	The text in Paragraph 9.2 on Page 9-2 has been changed to the following: "Results of the RI indicated radium 226 contamination at PRL 32 extending from the surface soil to a depth of approximately five feet bgs. Radium 226 concentrations were defined laterally but not vertically at six sample locations, though data show decreasing radium 226 concentrations with depth. RI results indicated that the contamination was the result of a surface release (URS, 2002g, p. 23).
23.	9.3	9-3	2nd Sentence		This sentence should be followed by text explaining that the Plutonium detection was confirmed in a subsequent analysis, and the presence of plutonium was unexpected for this site.	The following sentence has been added to Section 9.3, Page 9-3, First Paragraph: "The presence of plutonium was not expected for this site."
24.	9	9-7	2nd Pgph		The text as written makes a case that exposures to plutonium at this site "should not pose an unacceptable risk". This is based on the fallacy that we know what the plutonium levels are at this site. At this time, the only information we have is that plutonium was not supposed to be present in soil at this site, and plutonium was detected at low concentrations in the heavily worked soil waste pile which is not indicative of site plutonium levels. This uncertainty needs to be factored into the discussion in this paragraph.	The following text in Section 9.5.5 on Page 9-7 has been added to reflect the uncertainty:" It should be noted that this evaluation should be verified once site plutonium levels have been determined. Plutonium was detected at low concentrations in the heavily worked soil waste pile which may not be indicative of site plutonium levels."

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
25.	11	11-3			This section is highly inconsistent with the preceding sections. While McAFB is taking the necessary actions to address fuels, there are outstanding issues such as uncertainty over which sites are commingled; the development of final action levels for TPH at commingled sites, and the verification that all TPH sites have been adequately identified and/or characterized. A table similar to that presented at the end of Sections 4 through 10 should be provided at the end of Section 11 and the text augmented with more information on the fuel investigations and feasibility studies underway as part of the fuels and CERCLA programs.	A complete evaluation of the fuel sites can not be conducted at this point in time because of the aforementioned uncertainties. An effort has been made to capture the current status of the program in Section 11. Section 11.0, Pages 11-1 through 11-3, has been changed to 1) reflect this uncertainty over which sites are commingled and 2) acknowledge the fact that DTSC has requested the RWQCB ensure cleanup levels for TPH and other petroleum constituents at UST sites are protective of human health and water quality. As requested, a table similar to that presented in Sections 4 through 10 has also been added to Section 11.0 (Page 11-3). Furthermore, recommendations have been added on Page 11-3 to 1) complete sampling to determine which sites are commingled and 2) apply final cleanup levels for TPH once they have been determined.
26.		12-3	Untitled Table		The “Acreage Conveyed by Deed” in this table appears to conflict with the text at the end of the 3rd paragraph on page 12-2 which states “…since no deeds or RODs are currently in place at McClellan”. Please clarify this.	The statement “since no deeds or RODs are currently in place at McClellan” in Section 12.0 on Page 12-2 has been deleted. Furthermore, the acreages on the table located on Page 12-3 have been corrected.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
27.		12-6			"Maintenance and Monitoring". The text fails to identify McAFB's exemplary IC program which includes daily inspections of IRP sites. This program is extremely valuable at quickly spotting potential safety and security issues at McAFB.	Section 12.2.1 on Page 12-6 has been modified to include the periodic inspections the Air Force and others are conducting to monitor land use controls. The following text has been added to Page 12-6 under a header titled 'Periodic Inspections": "The Air Force and other stakeholders have been monitoring the implementation of LUC/ICs at the sites through visual site inspections. As part of this program, the AFCEE Field Team conducts frequent inspections at key remedial systems. Additionally, the Sheriff's patrol, as a result of the activities at CS 10, conducts daily evening, week-end, and holiday patrols of the key remedial systems. These inspections are in addition to those conducted in conjunction with routine operation and maintenance activities at existing remedial systems, as well as the quarterly OU B1 and OU D Cap inspections."
28.		12-10	Untitled Table		We believe it worthwhile to include the incident in 2002 where drums of potentially hazardous constituents were left on the side of an on-base road in the vicinity if IRP site SA 91.	As requested, the referenced incident was added to Section 12 and the associated table on Page 12-10 which shows some of the examples of incidents that occurred at McClellan and the improvements that were made to correct them.

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29.		12-13	1st Pgph		Because they are most directly influenced by a significant 'remedy' at McAFB, we believe the tenant occupying the OU B1 site should be interviewed as part of the tenant interviews for the 5-Year Review. This tenant should be asked whether they are familiar with the contamination below the cap and their opinion on the 'remedies'. Additionally, interviews of workers and tenants at the base need not be 'approved' by the LRA as stated in the text.	The tenant occupying the OU B1 site was not selected for a tenant interview for the Five-Year Review. The Air Force believes that the tenant understands the restrictions and conditions of operating on the cap for the following reasons: • On a quarterly basis, the Air Force conducts inspections of the cap in accordance with the O&M Plan for the OU B1 ROD. Contact with one of the managers of the company is made prior to the inspection. The Air Force, at the time of the inspection, reinforces the inspection requirement and the tenant understands the purpose for the inspection. • Over the last year, three encroachment permits have been submitted for work in and around the OU B1 Cap. Areas of contamination and digging restrictions are included in the permit approval. The Air Force also conducted a pre-visit prior to the work to ensure the tenant understood the conditions in the permit. • In 2002, the tenant notified the Air Force of a deteriorating condition at the cap so that the Air Force could perform repairs. This notification demonstrated that the tenant understands that the integrity of the cap must be maintained. The original text on Page 12-13 regarding the outstanding tenant interviews has been replaced to reflect the tenant interviews that have taken place on 13 November and 18 November 2003.
30.	12.7	12-18	Untitled Table		We believe the issues raised in the middle of the 1st paragraph of Page 12-14 should be included in the table.	The issues table in Section 12.7 on Page 12-18 has been modified to include the lack of formal tracking method and notification.

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31.	14.1	14-1			The text needs to make it clear that the No Action ROD was no action for non-VOCs only. In particular, VOC contamination is present on some of the sites. Additionally, the text should note that there is some uncertainty whether radiation wastes were buried in SA 39 as discussed in Department of Health Services comments on the No Action ROD and Proposed Plan.	The No Action ROD specifically states that this Record of Decision does not address possible groundwater or sewer line contamination at the six sites. These two items will be addressed under subsequent Records of Decision. All six sites were evaluated and determined not to be sources of potential VOC contamination based on historic use and/or results of prior investigations. In terms of SA 039, the text in Section 14.2.1 on Pages 14-2 and 14-3 has been revised to include a summary of the DHS review comments regarding potential radiological contamination at SA 039 and indicates the Air Force's approach to managing any potential uncertainty.
32.	15.3	15-2	2nd Bullet		Insert "and implement" between "make" and "recommendations".	The bullet on Page 15-2 has been modified, as requested.
33.		R-8	URS, 2002f		Note that this document is a Draft. Furthermore; this draft (Revision 2) document was published in December 2002; not September 2002.	The reference on Page R-9 has been modified, as requested.
34.			Table 4-3		Recommendation 5. Under "Actions Taken"; the text should note the recent resumption of well abandonment which is being done under the GWM program.	The text in Table 4-3 has been modified to include the recent well abandonment program.
35.			Table 4-4,		Page 1, Objective 1, 2nd Column, 3rd Pgph., Last Sentence. Insert "at the GWTP and Magpie Creek" between "sampling" and "is".	Table 4-4 has been modified, as requested.
36.			Table 4-4		Page 1, Objective 1, 4th Column. The text can now be updated to reflect the start up of the ion exchange treatment of hexavalent chromium at the GWTP.	Table 4-4 has been modified to reflect the startup of the ion exchange treatment at the Groundwater Treatment Plant, as requested.
37.			Table 4-4		Page 2, Objective 2, 2nd Column 2, Last Pgph. Please identify the current name for "Site 22".	The reference to Site 22 has been deleted from Table 4-4.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
38.			Table 4-4		Page 2, 3rd Column, 2nd Sentence. This sentence appears to contradict the 1st sentence. It makes more sense to change the first sentence to state that the Phase II system was 'forecasted' to hydraulically capture the plumes.	Table 4-4 has been changed, as suggested.
39.			Table 5-1		Comments Column. Rather than just say a "STOP was performed", the text should state which type of analysis was performed (i.e., Initial STOP, Final STOP, etc.).	Table 5-1 has been clarified to include the type of STOP process, as requested.
40.			Table 5-2		Last Column. For some systems, two operational efficiencies are presented. Please explain why there are two numbers.	Table 5-2 has been corrected. The operational system data has been updated with the Second Quarter 2003 information. Only one operational efficiency number is presented.
41.			Table 5-2		Page 2, SSA-2. There appears to be a typographical error in the Original Mass Estimates column.	The typographical error in Table 5-2 has been corrected in the Original Mass Estimates Column. The original mass estimate for both Total VOCs and PCE should be 16 lbs for SSA-2.
42.			Table 5-4		SVE RA Area IC 23, 5th and Last Column. It appears contradictory for there to be an Average System Flow Rate, and Influent VOC Concentrations, respectively, when Table 5-2 indicates the system was inoperational. If this is because the tables report data from different periods, then we suggest using the same period for the two tables.	Table 5-2 was updated with the information from the Second Quarter 2003 to ensure consistency in the data that is being presented. Information presented in Table 5-2 is general system information on the vadose zone remedial actions. The up-time operational efficiency in Table 5-2 in this Draft Final Five-Year Review document references the Quarterly Vadose Zone Monitoring Report from the Second Quarter 2003 and represents operational efficiency for the entire Second Quarter 2003. The information presented in Table 5-4 shows the most recent information from the Monthly Operations/Status Report for June 2003, the most recent available at the time the report was being prepared/submitted.

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43.			Table 6-1		3rd Column. Change the text to reflect the current understanding of material disposed of in CS-10 (including, but not limited to laboratory wastes from a radiation laboratory.	The text in Table 6-1 on Page 2 has been changed to: "Inactive disposal pit that was used from 1949 to the mid 1960s. The site was used for disposal of low-level radioactive waste, including, but not limited to laboratory wastes from a radiation laboratory, as well as from luminescent paints applied to dials and aircraft parts."
44.			Table 6-1		Page 2, 5th Column. This statement appears inconsistent with the text on page 10-9 that discusses measures taken to limit the potential for contamination be swept off-site into downstream areas. Text should be added to very briefly describe the special operations taken to restrict surface runoff.	Table 6-1, Page 2, Fifth Column has been updated to discuss the measures taken to protect sensitive habitats and biotic receptors of concern: "A weatherization tent covers the entire CS 10 site to prevent rain and rainwater run-on from entering the disposal pit. A drainage system was constructed around the tent to convey rainwater away from the site and prevent a storm surge from impacting the adjacent seasonal creek. Furthermore, excavated soils are containerized and stored inside the tent. On-going monitoring includes sampling in the adjacent ditches."
45.			Table 6-2		Page 2 of 4, 6th Column. The levels of VOCs in soil gas reported 1. 4 to 13.3 ppbv) are not consistent with levels that McAFB uses to initiate SVE; yet SVE is underway at OU D. Please verify that the maximum soil gas concentrations reported in this table are correct.	The VOC soil gas concentrations referenced in Table 6-2 on Page 2, Sixth Column have been reviewed and the units referenced in this column have been corrected from 'ppbv' to 'ppmv'.

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46.			Appendix B		EPA 5-Year Review Guidance states that State regulators should be interviewed. This hasn't occurred.	The Comprehensive Five Year Review Guidance (USEPA, 2001, p. Appendix C) identifies regulatory agencies as potential candidates for interviews as part of a broader group that should be considered (including local officials, community action groups or associations, residents and businesses located near the site, and other pertinent organizations or individuals). The requirement for community and other stakeholder interviews was fulfilled through the interviews conducted as part of the Community Relations Plan Update, and during the preparation of the Draft Five-Year Review Report (documented in Appendix B). Since McClellan conducts monthly BCT meetings with the regulators and forwards all relevant technical documents for regulatory review, comment and approval; the level of communication with the regulators is considered open and effective. As a result, additional regulatory interviews do not seem to be required or seem to be an effective use of limited regulatory resources. No changes have been made to the text.

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Comment Number	**Section**	**Page**	**Paragraph**	**Reviewer**	**Comment**	**Response**
RWQCB GENERAL COMMENTS (DATED 17 OCTOBER 2003)						
1.				RWQCB (James Taylor)	We appreciate the AFRPA's and their consultant's (Montgomery Watson Harza) efforts to address emergent chemicals in the Report. In several sections, the Report addresses the occurrence of "emergent" chemicals (e.g., 1,4-dioxane) in groundwater and in the discharge to surface water from the groundwater treatment plant (GWTP). The basis in the Report for evaluating protectiveness of human health and the environment for these compounds is the USEPA preliminary remediation goals [PRGs, e.g., for 1,4-dioxane, the PRG for tapwater is 6.1 micrograms per liter (ug/L)]. The Report also states that there are no established standards (i.e., maximum contaminant levels, MCLs) for these compounds. This approach fails to recognize the Board's narrative toxicity objective in Chapter III of the Water Quality Control Plan (Basin Plan, Fourth Edition, 15 September 1998) for the Sacramento and San Joaquin River Basins as an applicable or relevant and appropriate requirement (ARAR, see Specific Comment 7). The narrative toxicity objective addresses groundwater and surface waters and states that, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances." Applying these requirements results in the evaluation and selection of appropriate water quality limits (WQLs) that are protective of the designated beneficial use(s) of waters of the State. For 1,4-dioxane, for example, the most	The text in Section 4.5.5 (Question C) on Page 4-29 has been changed to reflect the Decision of the Senior Executive Committee (SEC) Resolving the Formal Dispute over the Proposed Plan for the VOC Operable Unit, McClellan Air Force Base (SEC, 2001). In that letter, the signatory parties (USEPA, US Air Force, and California Regional Water Quality Control Board) agreed (in part): • The parties recognize Section III.G of State Board Resolution 92-49 and the narrative toxicity objective for groundwater in Chapter III of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins ARARs for the McClellan VOC Record of Decision. • Under the currently available specific facts at McClellan, the Air Force and EPA believe that both ARARs result in a cleanup standard of 5 parts per billion (ppb) TCE, based primarily on economic feasibility. The State believes that application of both ARARs results in a cleanup standard for 2.3 ppb TCE. The Record of decision will state 5 ppb as the cleanup standard for TCE. The parties agree to proceed with the cleanup as proposed by the Air Force until such time as 5 ppb is achieved in each plume, as defined, by the BRAC cleanup team. At that point the Air Force in collaboration with the State and EPA Remedial Project Managers, agrees within 60 days to complete an analysis and prepare a report (using agreed up models), which evaluates the technical and economic feasibility of continuing remediation until plume levels reach 2.3 ppb TCE. This text has been added to Page 4-30.

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					conservative WQL is 1.3 ug/L (Cal/EPA Cancer Potency Factor as a drinking water level), and the next most conservative WQL is 3 ug/L (Department of Health Services, California State Action Level). Both of these levels are lower than the USEPA PRG for tapwater of 6.1 ug/L. Therefore, the Report does not take into consideration water quality protectiveness consistent with Board requirements. The Report should be revised to recognize the Board's Basin Plan narrative toxicity objective as an ARAR and address these issues accordingly. We are available to assist AFRPA in identifying appropriate WQLs for emergent chemicals, other non-volatile organic compound (non-VOC), and volatile organic compound (VOC) contaminants of concern (COCs).	

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2.					The Report states (in the Executive Summary, page ES-2) that, "This Five-Year Review has also identified those remedial actions or sites where State action levels differ from the Federal levels for the significant COCs." The Report does not take into consideration revised human health protective concentrations developed by the California Office of Environmental Health Hazard Assessment (OEHHA). Specifically, California Public Health Goals (PHGs) for McClellan VOC COCs in groundwater. When selecting numerical limits from the literature to interpret health based narrative water quality objectives or when selecting criteria for use in health risk assessments, the state prefers purely health-based criteria over risk-management criteria such as MCLs. The OEHHA's establishment of PHGs for PCE (0.056 ug/L), TCE (0.8 ug/L), and carbon tetrachloride (0.1 ug/L), are of particular concern since these levels are significantly lower than the MCLs for these constituents and are prevalent groundwater contaminants at McClellan. The Report should be revised to acknowledge the Board's requirements (see General Comment 1) and evaluate protectiveness of the groundwater remedy by taking into consideration California PHGs.	The Air Force notes the preference of the RWQCB to use purely health-based criteria over risk-based criteria such as MCLs. However, it is the purpose of this Five-Year Review to establish whether the current cleanup levels remain protective of public health and the environment. The evaluation included in Appendix C uses the latest USEPA and Cal/EPA toxicity criteria and evaluation methodologies; and the results of this evaluation showed that risks are in the acceptable range of 10^{-6} to 10^{-4}. The evaluation of lower cleanup levels, especially those not widely accepted, is beyond the scope of this Five-Year Review. However, the Air Force agrees that the protectiveness of the remedies will be evaluated in future FSs and RODs, and that any new cleanup levels established before 2009 should be evaluated in the next Five-Year Review. In the meantime, McClellan is taking additional precautions to ensure protectiveness in the form of LUC/ICs. Table 4-1 has been updated to reflect both McClellan action values as well as water quality levels for the contaminants of concern. Please also see Response to DTSC General Comments No. 4 and 5.
3.					The Department of Toxic Substances Control (DTSC) has requested that the Board ensure that the cleanup levels for TPH and other petroleum constituents at UST sites are protective of human health as well as water quality. We have submitted a proposal for DTSC's review and comment to address this issue. We will continue to coordinate with DTSC and the AFRPA to resolve this issue in a timely manner. Guidance on this matter as it pertains to the Report will be provided at the earliest opportunity. In the meantime, the Report should be revised to acknowledge this issue.	Section 11 (Page 11-2) has been changed to acknowledge the fact that DTSC has requested the RWQCB ensure cleanup levels for TPH and other petroleum constituents at UST sites are protective of human health and water quality. It is recommended that fuel contaminated sites are evaluated in the next Five-Year Review when a full determination has been made which sites are commingled and which are TPH-only sites. Please also see Response to DTSC Specific Comment No. 25.

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RWQCB SPECIFIC COMMENTS (DATED 27 MARCH 2003)						
1.	Exec. Summary	ES-6	Second Bullet	RWQCB (James Taylor)	See General Comment 1. Recent detections of 1,4-dioxane in the GWTP effluent are averaging about 1.4 ug/L. This concentration is above the most conservative WQL of 1.3 ug/L (Cal/EPA Cancer Potency Factor as a drinking water level). This suggests a possible risk to human health. This section should be revised accordingly.	In the absence of an accepted MCL, the Air Force has used a cleanup level for 1,4 dioxane consistent with the USEPA Tap Water PRG (6.1 ug/L), which is protective of human health. The Air Force acknowledges that lower levels do exist; however, the current average concentration of 1,4 dioxane in the GWTP system effluent (1.4 µg/L) is well below the Tap Water PRG and only slightly above the most conservative WQL noted in the comment (i.e., 1.3 ug/L Cal/EPA cancer potency factor used as a drinking water level). In practical terms, even assuming that 1.3 ug/L of 1,4 dioxane might represent a 10^{-6} health risk, a concentration of 1.4 ug/L does not change the risk significantly from 10^{-6}. As a result, if there was a possible risk to human health from the 1.4 ug/L concentrations, the risk would have to be considered very low and within the range acceptable to USEPA. The establishment of cleanup levels for 1,4 dioxane that are protective of both human health and the environment is still under evaluation and will be addressed in appropriate FS and ROD documents as well as the next Five-Year Review. The text in the Executive Summary (Page ES-7) and Section 4.5.5 on Page 4-26 has been revised to acknowledge potentially lower levels for 1,4-dioxane.
2.	Exec. Summary	ES-7			Recommendation 3. This recommendation should be revised to state that concentrations of 1,4-dioxane in the GWTP effluent are a possible health risk and may require action. The AFRPA is currently evaluating the effectiveness of the existing GWTP UV/OX system in treating 1,4-dioxane concentrations in a portion of the GWTP influent.	The parenthetical phrase "(including 1,4 dioxane) has been inserted into Recommendation 3 (Page ES-7) following "non-VOC" so that the recommendation reads: "Continue to evaluate the potential effect of non-VOC (including 1,4-dioxane) and inorganic contamination in the GWTP effluent on the protectiveness of human health and the environment."

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3.	Exec. Summary	ES-7 and ES-8			VOC Vadose Zone. This section states that the SVE program at McClellan is composed of 13 remedial systems, treating 22 remedial action areas, and that there are seven vapor-phased granular activated carbon (VGAC) systems. However, the Monthly Field Status Reports for soil vapor extraction (SVE) activities include 14 remedial systems, treating 23 remedial action areas, and that there are eight VGAC systems. Please evaluate these statements for accuracy, and revise the Report accordingly.	The number of SVE systems and remedial action areas in the Executive Summary and Section 5 has been reviewed and it was concluded that the numbers were correct at the time this report was being prepared. The discrepancy in the remedial systems (13 versus 14) and remedial action areas (22 versus 23) can be attributed to IC 19. At the time of the report, the FTO unit at IC 19 was under construction and was not included in the count. However, Section 5 (Page 5-1) and the associated tables have been updated to reflect information from the Second Quarter Vadose Zone Monitoring Report to ensure consistency with the latest SVE Monthly Operations/Status Report from June (URS, 2003n). According to the Second Quarter 2003 Report, there are 13 SVE treatment systems at McClellan, treating 23 removal action areas.
4.	4.2	4-6			1,4-Dioxane Background and Investigations. See General Comment 1. This section recognizes the USEPA PRG of 6.1 ug/L as the only regulatory threshold concentration when evaluating protectiveness. This section should be revised to include Board WQLs for 1,4-dioxane in comparing detected groundwater concentrations to regulatory thresholds.	Please see Response to RWQCB Specific Comment No. 1.

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5.	4.3.1	4-8			Second paragraph, next to last sentence. A Final Addendum to the GWTP Operations and Maintenance (O&M) Manual (Addendum, May 2003) was issued to meet the substantive requirements of the recently revised National Pollutant Discharge Elimination System (NPDES) permit (adopted on 24 April 2003). The Report should be revised to reference this Addendum and the referenced sentences should be revised to be consistent with the current GWTP monitoring requirements. Specifically, the treatment system influent is sampled annually and the effluent is sampled monthly for specified contaminants. For a full listing of sampling requirements and frequencies, see the Addendum and revise the Report accordingly.	The Addendum to the GWTP Operations and Maintenance Manual was reviewed and the text in Section 4.3.1 on Page 4-8 was modified to be consistent with the current monitoring requirements: "The treatment system influent and effluent are sampled according to the Final Addendum to the GWTP Operation and Maintenance Manual (URS, 2003e, Appendix I) which specifies annual influent samples for volatile organic compound (VOC) contaminants of concern (COCs) and monthly effluent samples for VOC COCs to Magpie Creek and to Don Julio Creek via Beaver Pond."
6.	4.3.1	4-10			1,4-Dioxane Remedial Actions, last sentence. See General Comment 1 and Specific Comments 1 and 2. Please revise this sentence to be consistent with the comments provided above and the requested revisions to the Report.	Please see Response to RWQCB Specific Comment No. 1.

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7.	4.5.1	4-12			The list of documents reviewed for the Report should include the, "Resolution of Formal Dispute on the Proposed Plan for the VOC Operable Unit, McClellan Air Force Base" (letter from Mr. Keith Takata, US EPA Region 9, Director, Superfund Division, dated 5 December 2001). This dispute resolution presents the recognition of State ARARs, Section III.G of State Board Resolution 92-49, and the narrative toxicity objective for groundwater in Chapter III of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins as ARARs for the McClellan VOC Record of Decision. This dispute resolution also presents the conditions under which the Board WQL for TCE of 2.3 ug/L will be evaluated and considered as an alternate cleanup level. The dispute resolution should be included in the Report and appropriate sections revised accordingly.	Section 4.5.1, Document Review for the Groundwater OU, has been revised (Page 4-13) to include the *Decision of the Senior Executive Committee (SEC) Resolving the Formal Dispute over the Proposed Plan for the VOC Operable Unit, McClellan AFB* (SEC, 2001). A paragraph has been included in Section 4.5.5, Technical Assessment for the Groundwater OU, under Final Groundwater Cleanup Levels (Pages 4-30 through 4-32), which describes a summary of the dispute resolution similar to that presented in the Response to RWQCB General Comment 1.
8.	4.5.5	4-20 through 4-26			Human Health Screening Assessment. See General Comments 1 and 2 and Specific Comments 1 and 7. Please revise this section to be consistent with the comments provided above and the requested revisions to the Report.	See Response to RWQCB General Comments No. 1 and 2. The human health screening assessments have evaluated the current remedial action objectives (RAOs), and this approach is consistent with Five-Year Review Guidance. If lower cleanup levels are established in future decision documents, then they will be evaluated in the next Five-Year Review. No changes were made in the text.

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9.	4.5.5	4-22			Protectiveness of GWTP Effluent, first sentence. This sentence references GWTP discharge requirements (June 17, 2003). We were unable to locate this reference in the References Section. The Final Addendum to the GWTP Operations and Maintenance (O&M) Manual was issued in May 2003. Please check the accuracy of this reference and revise the Report accordingly.	The reference in the first sentence on Page 4-24 of the Draft document was a Memorandum from AFRPA dated 17 June 2003 that a) explained the Air Force position regarding the substantive requirements of the NPDES Permit No. R5-2003-0052, and b) distributed the Final GWTP O&M Manual Addendum (dated May 2003), along with the attached errata sheet. Both documents have been added as a reference on Page 4-23 and have been included on the bullet list on Page 4-13 and the Reference Section on Page R-1 and R-8.
10.	4.5.5	4-23			Section 4.5.5, page 4-23, paragraph at bottom of page, second sentence: See Specific Comment 9, and revise the Report accordingly.	The Reference Section on Pages R-1 and R-8 has been expanded to include The Final Groundwater Treatment Plant O&M Manual Addendum (URS, 2003e) and the Air Force's Position on the Substantive Requirements of the NPDES Permit No. R5-2003-0052 (AFRPA, 2003g).
11.	4.5.5	4-28			Section 4.5.5, page 4-28, Final ROD Groundwater Cleanup Levels, last sentence: This sentence states that, "Achieving lower cleanup levels (e.g., 2.3 ug/L for TCE) will be based on technical and economic evaluations that will be conducted for the next Five-Year Review (anticipated in 2009)." This statement is inaccurate in that the technical and economic evaluations are not tied to the next Five-Year Review, but rather when 5 parts per billion (ppb) is achieved in each plume, as defined by the BRAC cleanup team. At that point, the Air Force agrees within 60 days to complete the analysis, with 30 days for the parties to reach agreement. Please revise this section and/or sentence to be consistent with the dispute resolution.	Section 4.5.5 on Page 4-30 has been modified consistent with the dispute resolution and reads as follows: " Achieving lower cleanup levels (e.g., 2.3 ug/L for TCE) will be based on a technical and economic feasibility evaluation after 5 ug/L is achieved in each groundwater plume. Within 60 days of achieving 5 ug/L for TCE, the Air Force will work in collaboration with State and EPA Remedial Project Managers to complete an analysis, using agreed upon models, and prepare a report which evaluates the feasibility of continuing remediation until plume levels reach 2.3 ug/L TCE."
12.	5.1	5-1	second paragraph		First sentence: See Specific Comment 3, and revise the Report accordingly.	Please see Response to Specific Comment No. 3.

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13.	11.0	11-3			Last sentence: See General Comment 3. This sentence states that, "As a result, there are no issues with the CERCLA Sites with Fuel Components at this time." This statement should be revised to acknowledge that there are potential indoor air health risk concerns with residual shallow fuel contamination, and that determination of cleanup levels and closure requirements will be based on future risk based screening criteria being developed by the State.	The statement in Section 11, Page 11-3, has been modified as suggested. The last sentence has been replaced with: "As a result, there are no definitive issues with CERCLA Sites with Fuel Components at this time. However, due to residual shallow fuel contamination, there may be potential indoor air health concerns that are identified in the future. Determination of cleanup levels and closure requirements will be based on future risk based screening criteria being developed by the State."
14.	References	R-3			The citation for A Compilation of Water Quality Goals should be corrected. Please correct to 'Marshack' (spelling error), and the title should include 'and Updates". As of the date of this Draft Report, the latest edition is August 2000. The newest edition was completed in August 2003. The Report's citation of the August 2000 edition plus updates is acceptable for this Report. However, future AFRPA documents should utilize and reference the August 2003 edition.	The reference has been changed to RWQCB, 2000; however, the August 2000 date was not changed. Section 1.4, Scope of the Five-Year Review, on Page 1-4 indicated that the Five-Year Review has incorporated all data and information that was available by the submittal date of this report (18 August 2003); any information that has become available or is becoming available after this date will not be incorporated until the next Five-Year Review in 2009.
15.			Table 4-1		See General Comment 1 and 2: This table should be revised to include a broader listing of Action Level than considered in the Report. These action levels should include California MCLs, PHGs, or other appropriate Board WQLs.	Table 4-1 has been revised to include a broader listing of potential cleanup levels in addition to MCLs.
16.			Table 4-3		Page 1 of 2, Recommendation 3, Actions Taken, second sentence: This sentence states that, "The on-base portion of Phase III is scheduled for late 2005." The off-base portion of Phase III will be completed first, followed by the on-base portion of Phase III. Please confirm the phasing strategy sequence and schedule for Phase III and revise this sentence accordingly.	The last two sentences under "Actions Taken" on Page 4-3 have been replaced with: "The Phase III implementation has been divided into two parts: a) off-base design and construction scheduled for 2003-2004; and b) on-base design and construction scheduled for 2004-2005."

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17.			Table 4-4		Page 1 of 4, Number 1: This Remedial Action Objective discussion is acceptable, however, we suggest updating the progress and recommendations to state that the ion exchange system at the GWTP has been installed and is in a six month prove-out period.	Table 4-4 has been updated as requested.
18			Table 5-1		Page 1 of 3 and 2 of 3: For SVE RA Areas IC-23, 25, 1, 7, and PRLS-13, the comment column states that STOP has been performed. The STOP process is not completed until the RPMs agree that the system can be shut-off permanently. A more accurate description of the status of these SVE systems would be to state that 'Initial STOP' evaluations have been performed. No 'Final STOP' decisions have been made for SVE systems to date. Please revise these statements accordingly.	A more accurate description of the STOP process status has been added to Table 5-1, as requested based on the April – June Quarterly Vadose Zone Monitoring Report, Second Quarter 2003 (URS, 2003r).

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EPA – TLI GENERAL COMMENTS (DATED 17 OCTOBER 2003)						
1.				EPA (TLI)	The Five-Year Review Report presents an analysis regarding the protectiveness of the Remedial Action Objectives (RAOs) established in the interim groundwater record of decision (ROD). Specifically, the health risks of the Maximum Contaminant Levels (MCLs) are evaluated, which does not appear to be necessary for the required protectiveness evaluation. We recommend that this analysis be deleted for the following reasons: a) Final cleanup goals for contaminants in groundwater at McClellan have not been established. As noted in Section 4.1, the selected remedial goal in the interim ROD is hydraulic containment such that migration of contamination off-base above California MCLs is prevented. MCLs are not strictly risk-based, and current cleanup goals for contaminants in groundwater are thus based on applicable or relevant and appropriate requirements (ARARs). As noted in Section 4.2.1 of the Five-Year Review Guidance, ARARs are normally frozen at the time of the ROD signature. If the ARARs have not changed, then the interim remedy should be considered to be protective and risk levels associated with the MCLs do not need to be evaluated unless a more stringent MCL has been established and it is necessary to determine whether the established cleanup goal no longer meets the standard of protectiveness.	The following response is from Carmen White, USEPA: "This email confirms our conversation today about the comments submitted regarding the draft McClellan Five-Year Review. EPA believes it is appropriate to include health risk calculations using the new TCE toxicity numbers currently being promoted by EPA Region 9. EPA RPM Joe Healy stated as much in his comments on the Five-Year Review workplan and EPA R9 toxicologists support this position as well. This means EPA is not in agreement with TechLaw's general comments on the draft Five-Year Review Report. One of the purposes of the Five-Year Review is to assess the validity of exposure assumptions, toxicity data, cleanup levels and RAOs. Therefore, we feel it is appropriate to discuss the current state of the science regarding these topics and EPA supports keeping the health risk discussion in the document. EPA has not approved the methodology for calculating RAOs for VOCs in soil gas or groundwater." Based on this response, no changes have been made to the Five-Year Review.

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1. (Cont'd)					b) A methodology for evaluating vapor intrusion into indoor air has not yet been agreed upon between the Air Force and the regulatory agencies, rendering the discussion of the risk associated with indoor air from groundwater contaminants at their respective MCLs premature. Further, since risk-based cleanup goals for groundwater could possibly be established as protective via exposures other than just direct ingestion (e.g., dermal exposures), as well as potential cumulative risks from all contaminants, the analyses of the health-based protectiveness of MCLs as RAOs presented in the Five- Year Review Report are inadequate and incomplete. Accordingly, it is recommended that the analyses of the health risks associated with the MCLs for both direct ingestion and intrusion into indoor air be deleted in order to facilitate the approval process for the Five-Year Review Report.	

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2.					As is the case with groundwater RAOs, final cleanup goals for vadose zone contaminants have not been established, nor has a methodology for calculating risk- based RAOs been agreed to by the Air Force and the regulatory agencies. The interim cleanup goals established in the engineering evaluation/cost analysis (EE/CA) are the soil-vapor equivalent of the contaminant MCL in groundwater (i.e., protection of groundwater quality). Whether final cleanup goals for volatile organic compounds (VOCs) in the vadose zone are based on protection of groundwater or protection of human health has not yet been determined, and a specific method for calculating health-based cleanup goals remains a subject for further discussion. The Five-Year Review Report is not the appropriate document to determine a methodology for either establishing or calculating health-based cleanup goals. Concurrence with the Five- Year Review Report as written would be incorrectly construed as approval of both the specific risk-based cleanup goals and the procedure for calculating them. We also note that the specific RAO for soil at McClellan to "protect human health from exposure…with soil that presents an unacceptable risk" was established in the feasibility study, which is not the decision document for undertaking removal actions for VOCs in the vadose zone at McClellan. Accordingly, the draft Five-Year Review Report should be revised by deleting the discussions of whether the soil-gas equivalents of the MCL in groundwater are protective of exposure via intrusion of vapors into indoor air.	The following response is from Carmen White, USEPA: "This email confirms our conversation today about the comments submitted regarding the draft McClellan Five-Year Review. EPA believes it is appropriate to include health risk calculations using the new TCE toxicity numbers currently being promoted by EPA Region 9. EPA RPM Joe Healy stated as much in his comments on the Five-Year Review workplan and EPA R9 toxicologists support this position as well. This means EPA is not in agreement with TechLaw's general comments on the draft Five-Year Review Report. One of the purposes of the Five-Year Review is to assess the validity of exposure assumptions, toxicity data, cleanup levels and RAOs. Therefore, we feel it is appropriate to discuss the current state of the science regarding these topics and EPA supports keeping the health risk discussion in the document. EPA has not approved the methodology for calculating RAOs for VOCs in soil gas or groundwater." Based on this response, no changes have been made to the Five-Year Review.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
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3.					Although the tables in Appendix C present EPA inhalation cancer slope factors, these values have been derived from inhalation unit risk factors, which are expressed as risk per micrograms per cubic meter (ug/m3). At a minimum, the appendix should be revised to provide an explanation of how inhalation unit risk factors were converted to the inhalation cancer slope factors with units of (milligrams per kilogram-day [mg/kg- day])-1. In addition, cancer slope factors and inhalation unit risk values are not unitless. Whenever presented in the text and tables, the appropriate units should be provided.	The tables in Appendix C (Tables C-1, C-2, C-3, C-4, and C-5) were revised to provide an explanation on the conversion of inhalation unit risk factors to inhalation cancer slope factors.

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EPA – TLI SPECIFIC COMMENTS (DATED 17 OCTOBER 2003)						
1.	5.5.5	5-8			Technical Assessment for Vadose Zone: It is not clear that the interim remedy at IC 7 would be considered functioning as intended if the current SVE system were the final remedy. It has been shown that the interim remedy implemented under an EE/CA is protective of current receptors. However, considerable mass remains at this site despite many years of operation, and there appears to be some uncertainty regarding protection of all hypothetical future receptors. In addition, the system has been shut down for three years, and hence is not functioning at all. U.S. EPA has been requesting that the Air Force restart the IC 7 soil vapor extraction (SVE) system since January 2003. At a minimum, optimization appears to be required at this site. Please revise the Five-Year Review Report to include a recommendation that optimization may be required before the remedy at IC 7 can be considered to be working as designed.	IC-7 has recently been restarted to optimize removal of shallow soil gas. The STOP evaluation has been suspended and any further borings have been delayed until the completion of the Shallow Soil Gas (SSG) risk evaluation. Because the Five-Year Review Report contains information that was available when the Draft version was issued, the text has not been updated to include this information. However, the following text has been added to Section 5.5.5 on Page 5-9: "The USEPA has requested that the Air Force restart the IC 7 SVE system because considerable mass remains at this site despite many years of operation and there appears to be some uncertainty regarding the protection of all hypothetical future receptors. Optimization may be required at IC 7 to assure long-term protectiveness."
2.	5.5.5	5-9			Technical Assessment for Vadose Zone: A basic assumption of the McClellan SVE program has been that volatile organic compounds beyond a depth of about 20 feet below the ground surface only pose a threat to human health due to leaching to the groundwater. However, it appears in recent years that the groundwater table is no longer falling and may, depending on land use in the McClellan vicinity, actually begin to rise. Please revise the Five-Year Review Report to recommend that, should hydrographs show trends indicating a rising water table, procedures will be implemented to design enhanced SVE operations to address the smear zone before residual contamination is re-mobilized by the rising water table.	The text has been modified under Technical Assessment of the Vadose Zone, Question C, Page 5-15, to include a paragraph that addresses the potential impact of rising groundwater levels. The paragraph includes the following: "As noted in Section 4.1, from 1982 to 1995, groundwater elevations beneath the base were decreasing at a rate of approximately one-foot per year. However, from 1996 to present, the decline of groundwater elevation appears to have halted, and in some cases may actually be rising (URS, 2003g, p. 2-25). If these rising elevations continue and become a trend, it will be necessary for the Air Force to develop a strategy for enhancing the SVE systems to address the smear zone before residual contamination is remobilized by the rising water table." Please also see Response to DTSC Specific Comment No. 3.

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3.	5.5.5	5-9			Technical Assessment for Vadose Zone: During the initial design of the SVE systems the Air Force assumed that each SVE extraction well had a radius of effective remediation of 400 feet. The Air Force also assumed that every portion of the site vadose zone was swept equally by the extraction wells regardless of soil type (feeling that the small scale heterogeneities of the site vadose zone produced an essentially homogeneous isotropic media). However, site operations data and testing conducted using the PneuLog(TM) tool have shown that the site vadose zone consists of inter-bedded strata of highly-pervious materials embedded in much more extensive strata of much less (two orders of magnitude less) pervious materials. In addition, SVE operations data from the site landfills currently undergoing SVE (IC 19, IC 42, Operable Unit [OU] C1 and OU D) indicate that the landfills behave much differently than the native materials at the site in response to subsurface air pressure gradients. In response to this, the Air Force has revised its Basewide Removal Action Work Plan for Soil Vapor Extraction to assure that every release location not directly under the influence (within a few tens of feet at most) of an SVE extraction well would either be directly remediated or would have a vadose zone monitoring point installed in it to assure that significant residual VOC contamination was not left in place after the completion of SVE. In addition, the Air Force determined that radii of effective remediation were drastically- reduced at landfill sites due to the highly-pervious nature of the materials disposed of in the landfills and that very careful vacuum measurements would be necessary at landfill sites to assure that SVE was effectively	The Air Force and USEPA have maintained different views toward the vadose zone site conceptual model at McClellan. These differences are still being resolved and will be further evaluated and refined, as more data becomes available from the ongoing SVE program. While these conceptual differences may be important for developing final cleanup strategies and remedial alternatives, they do not affect the protectiveness of the current interim remedies that the Air Force has voluntarily implemented at McClellan. The issue of protectiveness is the focus of this Five-Year review, and the evaluations presented in Section 5.0 and Appendix C conclude that the interim actions have been protective. The current interim remedies have been discussed and implemented with the concurrence of the BCT. In addition, the systems are implemented, operated and evaluated according to the McClellan START/STOP criteria, which were developed with BCT concurrence.

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					removing VOC from the landfills. Please revise the Five- Year Review Report to include a discussion of the evolving Air Force site conceptual model for SVE and the steps the Air Force has taken to optimize the SVE program in response to the changed site conceptual model.	
4.			Table 5-1		Vadose Zone Treatment Systems Summary: For systems that are not currently operating, please indicate that the extraction wells are not in use (fifth column of the table) or change the column title. For SVE systems for which STOP analyses have been performed, please provide the results of the STOP analysis. Please provide the total amount of operational time for the systems against the total possible amount of operational time and also against the total intended operational time (e.g., if the system was installed on January 1, 2000, there have been 32,232 hours of possible operation time between 1/1/2000 and 9/5/2003. If the system operated 25,000 hours between those dates, the availability would be 78%. If there were 3 months of planned down time for a rebound test, the total intended operational time would be 30,048 hours for an availability of 83%).	The column title on Table 5-1 has been changed from "Current SVE/DPE/SVM Wells In Use" to "SVE/DPE/SVM Wells (During System Operation)". The "Comments" column is used to note whether the system was not operational during the period. All initial or interim STOP analyses that have been proposed are referenced in Table 5-1 to their the respective Quarterly Vadose Zone Monitoring Reports. Operational data for the systems can be found in the Quarterly Vadose Zone Monitoring Reports, as well as the Monthly Operation/Status Reports.

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5.	7.5.5	7-5			Technical Assessment for the OU D Cap: Typically, closed landfills are topographically-surveyed every five years to assess waste settlement. Settlement of landfills closed using geomembranes can be a problem as the low spots in the cap can form depressions into which water will collect and, if there are imperfections in the membrane, drain into the landfill. Please revise the Five-Year Review Report to indicate if the OU D cap has been topographically-surveyed since its construction in 1985. If there is no initial survey data, a current survey would provide no useful information and potholing should be conducted on the cap to evaluate if the membrane is still serving a useful purpose.	The OU D Cap has not been topographically surveyed since its construction. Because the disposal site is not a municipal landfill with a tendency for settlement due to decomposing waste materials, potholing is not considered necessary or appropriate. The Air Force is currently conducting quarterly inspections which include evaluations for cracks, subsidence/settlements, etc. These inspections are considered appropriate to determine whether any settlement is occuring at the site. In the future, the Air Force may elect to verify the condition of the liner during any future work that may take place on the cap (well installation, etc).

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6.	8				Potential Release Location (PRL) S-033: The following problems were noted in this section of the Five-Year Review Report: a) The RAOs for PRL S-033 are not explicitly provided. Section 8.2 notes that the 1999 Region 9 Preliminary Remediation Goals (PRGs) were used to develop cleanup levels for the protection of human health, but it is not clear how the cleanup levels were developed (were they simply the PRGs?). The text in Section 8.3 states that polychlorinated aromatic hydrocarbons (PAH) levels above the benzo(a)pyrene equivalent concentration of 0.062 milligrams per kilogram (mg/kg) were excavated, but it can only be inferred that this represents the cleanup goal, and the meaning of benzo(a)pyrene equivalent concentrations is not explained.	Responses to this comment are as follows: a) Please see Response to Specific DTSC Comment No. 21 for the first part of the response. Furthermore, the text in Section 8.2 on Page 8-3 has been modified for clarification: "The Benzo(a)pyrene Toxicity Equivalency Factor (TEF) approach was used to calculate a single PRG for PRL S-033. This method calculates the carcinogenicity of a mixture of polycyclic aromatic hydrocarbons (PAHs) relative to the carcinogenicity of benzo(a)pyrene using Relative Potency Factors (RPFs) found in the US EPA *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons* (US EPA, 1993). Benzo(a)pyrene is used because it is the best studied PAH. For the purpose of the removal action at PRL S-033, a single PRG benzo(a)pyrene [B(a)P] equivalent concentration of 0.062 mg/kg was calculated."
					b) The text on page 8-6 states that since the initial assessment of residual risk, the only change of note has been the use of oral cancer slope factors as inhalation slope factors, and that this has resulted in a two-fold increase in the applied cancer slope factor. The basis for this conclusion is not clear as the resulting increase in risk from this revised method would be proportional to the estimated dose via inhalation relative to the dose via ingestion, and not simply a two fold increase.	b) The oral cancer slope factor (CSF) is currently being extrapolated to evaluate the risks from the inhalation pathway. The extrapolated value is twice the previous inhalation CSF. This results in a two-fold increase in CSF applied to the inhalation pathway. However, because the inhalation risk presents less than 1% of the total risk across all pathways, as noted in Table 5-7 of the original PRL S-033 Removal Action Report (Roy F. Weston, 2002a), the change in CSF has no effect. The text in Section 8.5.5 on Page 8-6 has been clarified to reflect that the increase in the inhalation CSF does not affect the protectiveness of the remedy. [Page 8-6]

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					c) The text on page 8-6 also states that inhalation pathways do not contribute significantly to risks from PAHs. This statement is incorrect, as EPA considers several PAHs to be probable human carcinogens by all routes of exposure, including inhalation. While it appears that, for the PRL S-033 risk evaluation, the relative contribution from the inhalation pathway to the overall risk estimate was not significant, this should be stated directly. Please revise this section of the report to clearly provide the RAOs established for each of the PAHs, clarify whether use of the oral slope factor as a surrogate for evaluating inhalation exposure has resulted in a two-fold increase in the estimated residual risk as stated, and revise the statement that inhalation does not contribute to overall risk from PAHs as needed to accurately describe the interim RAOs for PRL S-033. In addition, please provide a brief explanation of benzo(a)pyrene equivalent concentrations.	c) Please see Response to Comment No. 6a) above for the explanation of the benzo(a)pyrene equivalent concentration and Response to Comment No. 6b above for the inhalation risk evaluation.
7.	15				Section 15, Recommendations and Follow-up Actions: This section should discuss a timeframe for implementation of the recommendations, and identify the agency or agencies with oversight authority, as stated in the guidance. Please include this information in the next version of the Five-Year Review Report.	The text on Page 15-4 has been modified to include the general guideline that all recommendations should be implemented prior to the next Five-Year Review (2009) and that oversight authority is represented by the State and Federal Remedial Program Managers.

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8.	Section C.1.1				Stack Emissions from SVE Treatment Systems: Please make the following revisions to this section: a) provide sufficient additional description of the dilution model applied here such that the calculations may be verified by an independent reviewer, b) carcinogenic risk should be evaluated for ethylbenzene using a provisional inhalation unit risk value of 1.1E-6 (ug/m3)-1, c) combine the dioxin/furan risk estimates from Table C-1 with the VOC emission risk estimates presented in Table C-1 such that cumulative risk from all treatment plant emissions is presented in a single table.	The responses to these comments are listed below: a) The formula for the dilution model is included as a footnote in Table C-1 in Appendix C. A sentence has been added to Section C.1.1 explaining the elements of the formula. b) Table C-2 has been revised to include risks from a provisional inhalation unit risk value of 1.1 x 10-6 (ug/m^3)-1 for ethylbenzene. c) Table C-1 has been revised to include cumulative risks from dioxin/furan and VOC emissions from the treatment plant.
Errata 1.					Executive Summary, Potential Release Location S-033, Page ES-13: The last sentence of this section refers to PRL-033, but should refer to PRL S-033. Please correct the site name in the next version of the Five-Year Review Report.	The typographical error on Page ES-16 has been corrected in the text.
Errata 2.					Section 1.4, Scope and Nature of Current Five-Year Review, Page 1-4: The text states that there are 318 sites at McClellan. However, the text in Section 3.1, Page 3-2 states that there are 319 sites. Please resolve this discrepancy.	The total number of sites within or adjacent to McClellan is 318. However, as noted on Page 3-2, the Davis Global Communications Site, is also normally included with the McClellan site list but represents a separate site geographically and is being evaluated separately for a Five-Year Review. As a result it is not addressed in this report. The text in Section 3.2 has been modified to clarify this point.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
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EPA – NED BLACK GENERAL COMMENTS (DATED 17 OCTOBER 2003)						
1.				EPA (Ned Black)	I have reviewed the draft Five Year Review Report [DSR #870-1] for McClellan AFB. I found the document refreshingly simple and accurate regarding the general lack of remedy activity for ecological risk on site. The plans described for future decision documents addressing ecological risk appear accurate. I have no specific comments or suggested changes.	The comment does not require a response.
EPA – ROBERT CARR COMMENTS (DATED 17 OCTOBER 2003)						
1.				EPA (Robert Carr)	My review of this document focused on the discussion of ICs. I did not evaluate the technical data or the protectiveness determinations in detail but did not find any obvious flaws. I think the draft document does a reasonable job of describing the need for control measures although cross references to Section 12 which describes the mechanism by which control measures have been implemented e.g. Site Management Plan, lease restrictions, etc, should be added in the site specific portions of the report. The discussion of the restrictions to be implemented prior to deed transfer needs to be revised and expanded to reflect the ongoing discussion between EPA, the State and the Air Force, including the role of the State Land Use Covenant and the Air Force agreement to sign such an instrument under certain conditions.	Since the focus of the Five-Year Review was on remedial actions (and operating systems) rather on specific sites or contaminated areas, the Air Force believes it is more appropriate to discuss the LUC/IC issues as a separate section to present a clear picture of the approach and to evaluate effectiveness. However, references have been added to the site-specific sections that point the reader to Section 12 for the evaluation of LUC/ICs. In terms of the State Land Use Covenant, please see the Response to DTSC General Comment 7.
2.	12.5				The text in section 12.5 needs clarification. The conflict between the regulators and the Air Force is not focused on who should enforce the restrictions as against third parties; but rather the extent to which the IC implementation mechanism should be enforceable against the Air Force under the FFA. Progress has been made in defining/limiting the scope of enforceable obligations and this section should be revised accordingly.	The introductory sentence under Section 12.5 on Page 12-16 has been revised. "The Air Force, the State of California, and the USEPA agree that LUC/ICs are critical to the protection of human health and the environment." Furthermore, Section 12.5, Page 12-16, has been updated to reflect the current description of the SLUC process.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
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3.		ES-15			Introduction to PRL 32 needs to include a description of the action taken.	The introduction on Page ES-17 has been modified in accordance with the comment: "The chosen removal action for PRL 32 was an interim action consisting of an excavation and off-site disposal".
EPA – GLENN KISTNER SPECIFIC COMMENTS (DATED 17 OCTOBER 2003)						
1.		ES-11	2nd paragraph	EPA (Glenn Kistner)	Should RAOs be changed to "remedy"?	The text responds to Question B which asks if the assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid. As a result, the discussion of interim and final RAOs is appropriate.
2.		ES-11	3rd paragraph		"acceptable risk " should either be changed to "allowable risk" or "acceptable" should be deleted. Please do a universal search for the phrase "acceptable risk" and make the necessary changes.	The use of the term "acceptable" is taken directly from 40 CFR Part 300 NCP (300.430(e)(2)(I)(A)(2): "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}." As a result, the term has been retained.
3.	ES	ES-12			Was the OU D cap installed per a (interim or final) ROD or was it part of a removal action? Please add a bit more background to the paragraph.	The OU D Cap was not part of a removal action nor was it installed per a ROD. The Executive Summary on Page ES-13 was expanded as requested: "The cap at OU D was installed as a temporary remedy to prevent infiltration from precipitation and control off-gas emissions. The final remedy will be developed as part of the Strategic Sites Feasibility Study and ROD which will determine whether the cap represents the final remedy for this site."
4.	ES	ES-18	2nd paragraph		What kinds of control measures are in place? Please try to be more specific.	This section is designed to summarize the status and assumptions for development of RAOs at CS-10. We have revised the paragraph on Page ES-20 to include a summary listing of control measures.
5.	ES	ES-22			Neither an EE/CA nor a creek tailings removal action have taken place yet, therefore, the "Creek Tailings Removal Action" bullet should be deleted or reworded to reflect reality.	The bullet on Page ES-24 has been modified to: "Creek Tailings Investigation (part of a future Removal Action)."

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
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6.	ES	ES-23			#1: Complete the EE/CA? It hasn't even been started yet. How about changing to write an EE/CA?	The text on Page ES-25 has been changed to: "Prepare an EE/CA for the creek tailings removal action, and implement the removal of contaminated tailings according to the accepted plan."
7.	6	6-9			See comment # 2.	Please see Response to Specific Comment No. 2.
8.	6	6-11			The monitoring frequency of the sediment traps should be stated	The sediment traps are monitored on a semi-annual basis during the fourth and first quarters; however, the drainage ditches are inspected quarterly. The text on Page 6-12 has been modified as requested.
9.	6	6-13			What is the time table for developing a formal decision process for acting upon PCB concentrations...?	The Air Force will prepare an Addendum to the existing O&M Manual in 2004.
10.	14	14-1			What is the date of the No Action ROD? Also, please state the approximate total acreage of the sites.	The date for the Final No Action ROD is 16 January 2003. The total acreage for the six sites is approximately 3. Section 14 on Page 14-1 has been revised to include this information.
EPA – HQ COMMENTS (DATED 17 OCTOBER 2003)						
1.				EPA HQ	Five-Year Review Summary Form: EPA HQ suggests using and adding the table format suggested by the guidance in Appendix E page E-17.	The Five-Year Summary Form for the entire former McClellan AFB has been completed and is part of the report (Table 1-1). The summary form does reference pertinent sections within the report for detail to avoid duplication.

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2.	2				Authority for Conducting the Five-Year Review; Section 2: EPA HQ suggests using the language given in the guidance in Appendix E, page E-19, for the Authority for Conducting the Five-Year Review: The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states: *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104]or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.* The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states: *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*	The suggested language has been added to Section 1 , Pages 1-1 and 1-2 of the Five-Year Review Report.

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3.					Other Review Characteristics: In page 1-2 the review says "Since the final RODs for McClellan have not been developed, this study was carried out as a policy review." However, for me this second five year review is still statutory because in the guidance page 1-7, section 1.5.3 it says "Regions should conduct five- year reviews for interim or early actions selected under CERCLA §121 consistent with section 1.2 of this guidance. For instance, Regions should conduct a review if an alternate water supply is installed and hazardous substances, pollutants, or contaminants remains on site above levels that allow for unlimited use and unrestricted exposure. If a subsequent action reduces the hazardous substances, pollutants, or contaminants on site to levels that allow unlimited use and unrestricted exposure, then reviews may be discontinued." In addition, the remedy selected for gunite liner on OU B1 Cap and Drainage Ditch has left contaminants that required the implementation of Land Use Controls and deed restrictions on excavations activities. The OU B1 Cap and Drainage Ditch also has a cap in place for reducing exposure to PBC. This cap has access limitations and deed restrictions. The other area that forms the OU B1 Cap and Drainage Ditch is the Unlined ditch which also has a Land Use Controls and deed restrictions. The last reason for support that this second five year review is a statutory one is that the IRODs were signed after SARA. For those reasons, I suggest changing the review category from policy to statutory.	The Air Force acknowledges the difference in interpretation held by US EPA regarding a policy versus a statutory review. The Draft and Final Five-Year Review Work Plans for McClellan presented the Air Force position for proposing this Five-Year Review as a policy rather than a statutory review. The reasoning was based entirely on the USEPA Guidance Document criteria. Since the Work Plan went through USEPA review without comment on this issue, the Air Force is proceeding with the opinion that this review is policy. We understand that the USEPA will submit a letter presenting their position but will accept this document as a policy review. No changes have been made to the Five-Year Review Report.
4.					EPA HQ recommends adding a list of all important site events and relevant dates. Appendix E, page E-21, Table 1 illustrate an example.	The Five-Year Review on Page 3-3 has been changed to reference the chronology presented in the BRAC Cleanup Plan (URS, 2003a).

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5.					Remedial Actions on Sect. 4 Groundwater OU and Sect. 6 OU B1 Cap and Drainage Ditch: EPA Headquarters suggests adding information regarding System operations/Operation and Maintenance.	References have been added to Section 4.5.5, the Technical Assessment for the Groundwater OU, to indicate that operational costs for the Groundwater Treatment Plant are reported in the monthly Operations and Status Reports (Page 4-19). Section 6.5.5, Technical Assessment for the OU B1 Cap and Drainage Ditch, presents a short discussion of annual O&M costs for the OU B1 Cap and Drainage Ditch (Page 6-9). Section 7.5.5, Technical Assessment for the OU D Cap, presents a short discussion of annual O&M costs for the OU D Cap (Page 7-6).
6.					Tech Assessment on Sect 4 Groundwater OU and Sect. 6 OU B1 Cap and Drainage Ditch: I suggest adding information regarding the cost of System operations/Operation and Maintenance.	Please see Response to USEPA HQ Comment No. 5. In addition, references have been added to Section 5.5.5, Technical Assessment for the Vadose Zone, to indicate that operational costs for the vadose zone treatment systems are reported in the Monthly Operations/Status Reports (Page 5-9).

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EPA – JOE HEALY GENERAL COMMENTS (DATED 17 OCTOBER 2003)						
1.				USEPA (Joe Healy)	Overall, this report met my expectations and followed the work plan. I have very few comments.	Comment was noted and no changes are necessary.
2.					For assessing the protectiveness of lease restrictions, please make it clear that you are in contact with those currently involved with day to day operations at important sites (e.g., OU B1 lumber business, fire training area and closest businesses to PRL -32 and PRL S-33 etc.). Also, Appendix B needs some supporting documentation related to actual businesses and tenants. The current draft report provides an imbalanced appearance, pointing towards heavy reliance on the PRP, its contractors, and the LRA and its development partner. Furthermore, there is an indication that the LRA or developer might have had a controlling effect on the manner in which some of this information was or will be obtained.	Section 12 of the Five-Year Review Report presents the mechanisms that are currently in place at McClellan to ensure monitoring of LUC/ICs. In particular, the periodic inspections that are described in the Draft Final Five-Year Review Report (please see Response to DTSC Specific Comment No. 27) ensure the protectiveness of lease restrictions. Appendix B has been updated to include the interview records of the four tenant interviews conducted on 13 and 18 November 2003. An additional four interviews were conducted with tenants from the Air Force and McClellan Park to evaluate the tenants' knowledge and understanding of the contamination at the base, lease restrictions on their property as well as the Air Force's encroachment permit process. The Air Force is making an effort to cooperate with other major stakeholders, including the LRA, to carry out its responsibilities. The interviews have been conducted and Section 12 on Page 12-13 has been updated. Please also refer to Response to USEPA Specific Comment No. 4 below.

RESPONSES TO COMMENTS ON THE DRAFT MCCLELLAN FIVE-YEAR REVIEW						
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EPA – JOE HEALY SPECIFIC COMMENTS (DATED 17 OCTOBER 2003)						
1.		ES-7			Recommendation 1. : Delete the clarifying phrase "beyond McClellan boundaries." Groundwater containment applies equally inside and outside the former base boundaries. The objective is to keep the plumes from further spreading in any of their three dimensional directions. Make this same change in the main body of text wherever it might also occur.	The wording 'beyond McClellan boundaries' has been deleted in the Executive Summary on Page ES-7, as requested.
2.		ES-21			Question B : The answer to the question is not quite correct. You should provide a more detailed answer that explains that such information has not yet been determined because final RODs have not been completed and the two interim RODs did not include LUCs or criteria for determining when and where to apply LUCs. Final RODs at McClellan are expected to address these concerns. During the interim, lease restrictions apply everywhere to be conservative until RODs specify unrestricted use standards for individual LUCs.	The answer to Question B in Section 12 on Page 12-14 and the Executive Summary on Page ES-23 have been modified, as requested: "The response to Question B can not be determined at this time because final RODs have not been completed and the two interim RODs did not include LUC/ICs or criteria for determining when and where to apply LUC/ICs. Final RODs at McClellan are expected to address these concerns. During the interim, lease restrictions apply everywhere and appear to be conservative until RODs specify unrestricted use standards for individual LUC/ICs."
3.		4-10			1,4-Dioxane Remedial Actions : Update this section with the latest information from the UV/ox system and measurements of hexavalent chromium and 1,4-dioxane.	The GWTP effluent sampling results for 1,4-dioxane have been included in Section 4.3.1 (Page 4-10) through August 2003 which is the date of the Draft Five-Year Review Report.
4.	12.4.4	12-13	last paragraph		Please reword this paragraph to remove the appearance that the LRA (or developer?) have a major say or approval authority over how the lead agency (Air Force) conducts a CERCLA investigation. If, in fact, those or other parties exercised a controlling effect on the manner in which the Air Force obtained information for this Five Year Review Report, you need to fully explain the basis for such control and to what degree such control could or did bias the investigation results.	The Air Force is responsible for investigation and remediation activities at McClellan under CERCLA. However, the Air Force also makes every attempt to cooperate with other major stakeholders, including the LRA, to carry out its responsibilities. Accommodating the scheduling needs of the LRA is not considered by the Air Force a source of bias or undue influence on the outcome of the interviews. The text in Section 12.4.4 on Page 12-13 has been changed reflect the fact that the interviews have occurred.

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5.	12.4.5	12-14			Bottom portion of top paragraph : Do you make formal recommendations to establish the type of tracking systems described in the final three sentences of this paragraph? If not, why not?	Please see Response to DTSC Specific Comment No. 30.
6.		17-1			2nd and 3rd sentences : Given the history of the McClellan cleanup program and the complications of reuse during a time of decreasing resources, it is unreasonable to expect that "the RODs will have been completed" by the next review in April 2009. Re-word these two sentences to indicate that some final remedies will have been selected and some of those will be in place. Clarify that it is unlikely that all RODs will have been completed by 2009.	The Air Force concurs. The text in Section 17 on Page 17-1 has been revised to indicate that some final remedies will have been selected and some of those remedies will be in place; however, it is unlikely that all RODs will have been completed by 2009.
EPA – CARMEN WHITE SPECIFIC COMMENTS (DATED 13 NOVEMBER 2003)						
				EPA (Carmen White)	This email confirms our conversation today about the comments submitted regarding the draft McClellan Five-Year Review. EPA believes it is appropriate to include health risk calculations using the new TCE toxicity numbers currently being promoted by EPA Region 9. EPA RPM Joe Healy stated as much in his comments on the Five-Year Review workplan and EPA R9 toxicologists support this position as well. This means EPA is not in agreement with TechLaw's general comments on the draft Five-Year Review Report. One of the purposes of the Five-Year Review is to assess the validity of exposure assumptions, toxicity data, cleanup levels and RAOs. Therefore, we feel it is appropriate to discuss the current state of the science regarding these topics and EPA supports keeping the health risk discussion in the document. EPA has not approved the methodology for calculating RAOs for VOCs in soil gas or groundwater.	The comment has been noted and does not require a response. Please also note the Response to EPA TLI General Comments No. 1 and 2 on Pages 38 and 39 of this Response to Comments Table.

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US FISH AND WILDLIFE SERVICE – DR. BECKYE STANTON GENERAL COMMENTS (RECEIVED 31 OCTOBER 2003)						
1.				US F & WS	The U.S. Fish and Wildlife Service has reviewed the draft Five-Year Review Report for the Former McClellan Air Force Base, and is providing the following comments, primarily focused on ecological evaluations, in accordance with the National Contingency Plan (40 CFR, part 300, subpart G). We are available to discuss these comments further, if you so desire.	The comment has been noted and no response is necessary.
US FISH AND WILDLIFE SERVICE – DR. BECKYE STANTON SPECIFIC COMMENTS (RECEIVED 31 OCTOBER 2003)						
1.	6				We recommend adding analysis for dioxin/furans, lead, and mercury to the current analyses completed for sediment from operational unit (OU) B1 drainage ditches as these chemicals were detected at elevated levels in OU B1 soil samples. If the Air Force is currently doing these analyses, please indicate that in the text.	The Operations and Maintenance Plan for the OU B1 Drainage Ditch requires that analyses be conducted for dioxins/furans, PAHs, and metals if elevated levels of PCBs are detected in any soil or sediment sample. In accordance with this protocol, sediment from the trap found to contain elevated levels of PCBs during the First Quarter 2003 inspection was also analyzed for PAHs, dioxins/furans, and metals, including lead, mercury, and arsenic. None of these constituents were detected. The unlined ditches have been backfilled with at least two feet of clean material. Installation, maintenance and monitoring of the sediment traps has been designed to detect and intercept contamination prior to reaching Magpie Creek. Therefore, additional sampling of the unlined ditches is not considered appropriate at this point in time. Please also see Response to DTSC Specific Comment No. 17.

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2.	6				We recommend establishing interim ecological benchmarks for polychlorinated biphenyls (PCBs) for concentrations of PCBs in accumulated sediment from the drainage ditch sediment traps to address potential exposure of organisms to the sediment present in the drainage ditches.	The cleanup level for PCBs of 0.025 mg/kg has considered ecological receptors and is being used as the ecological benchmark for ongoing monitoring. If sediments containing elevated levels of PCBs were detected during the maintenance and monitoring of the sediment traps, action would be taken to determine the source and prevent downstream migration of contaminated sediments and exposure of ecological receptors. Please also see Response to Comment No. 1 above.
3.	13				Please revise the following statement on page 13-7, "removal actions are not proposed for other ecological sites where risks have been identified…," to state that no interim removal actions are proposed and that identification of final remedial alternatives and remedial action areas will occur in the future as part of the Ecological Sites Feasibility Study and Record of Decision.	The sentence in Section 13.5, Page 13-7, has been changed to: "No interim removal actions are proposed for other ecological sites where risks have been identified (e.g., Don Julio and Magpie Creek). Identification of final remedial alternatives and remedial action areas for these sites will occur in the future as part of the Ecological Sites Feasibility Study and Record of Decision."

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4.	13				Interim ecological benchmarks for 1,4-dioxane and hexavalent chromium should be established as concentrations above which groundwater treatment plant effluent should not be discharged to the creek. The potential ecological impacts from hexavalent chromium-contaminated effluent are particularly of concern since the current McClellan criterion for effluent hexavalent chromium (10 μg/L) exceeds the EC20 for daphnids (0.5 μg/L) and the sensitive species test EC20 (0.266 μg/L) (Suter and Tsao, 1996).	40 CFR Part 131 Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, Section M, Endangered Species Act states that: "Pursuant to section 7(a) of the Endangered Species Act (ESA), EPA has consulted with the U.S. Fish and Wildlife Service and the U.S. National Marine Fisheries Service (collectively, the Services) concerning EPA's rulemaking action for the State of California. EPA initiated informal consultation in early 1994, and completed formal consultation in April 2000. As a result of the consultation, EPA modified some of the provisions in the final rule. The Services in turn issued a final Biological Opinion finding that EPA's action would not likely jeopardize the continued existence of any Federally listed species or result in the destruction or adverse modification of designated critical habitat." The CTR Continuous Concentration Criterion (CCC) for hexavalent chromium is 11 ug/L for the protection of freshwater aquatic biota community per the 40 CFR Part 131 section M quoted above. The Air Force acknowledges that there may be cleanup levels lower than the CTR standards; however, the CTR standards are promulgated and are the Applicable or Relevant and Appropriate Requirements (ARARs). Currently the CTR standards are considered to be protective of the environment. FWS will have a chance to comment on the discharge levels in the Non-VOC Groundwater FS and ROD. No changes have been made in the text.
5			Table 6-2		Please confirm that all organic chemical concentrations listed for OU B1 on Table 6-2 are in mg/kg as stated on the table, particularly dioxins/furans (17.8) and Aroclor 1260 (240,000).	Table 6-2 has been reviewed and revised to reflect dioxin/furan concentration of 0.0178 mg/kg. The values for Arochlor are shown as mg/kg in the referenced document and are correct.

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6.			Table 6-2		For CS-10 on Table 6-2, please provide maximum concentrations for each chemical of concern.	Table 6-2 has been revised according to available data for CS-10.
7.			Table 6-3		In Table 6-3 for OU B1, please include "Continue removal of sediment from drainage ditch sediment traps and monitoring of chemical concentrations in the accumulated sediment" under the recommendations heading of objective #8.	Table 6-3 has been modified as requested.
8.			Table 6-3		In Table 6-3 for OU B1, please clarify what controls and monitoring are in place for residual contamination not excavated and placed under the cap in 1994.	All residual contamination that was not excavated is located under the cap. Sediment traps are in place to intercept and monitor residual contamination that may leave the cap. No changes have been made to Table 6-3.
SMAQMD – LONI ADAMS SPECIFIC COMMENTS (RECEIVED 24 NOVEMBER 2003)						
1.					Currently, I am working on looking into the public health risk for the McClellan GWTP and a I will be looking at doing a health risk assessment on 2 or 3 of the soil vapor extraction systems as well. If the health risk indicates a greater than one in one million health risk to the maximum impacted residence or non-residential commercial receptor, then T-BACT will be required for the currently regulated toxic air contaminants at the very least for the individual systems. So far that I have seen from the monthly SVE emission reports, there is no indication that BACT requirements are triggered for the regulated criteria pollutants. ROC, of particular concern, is not over > 10 lbs/day in the stack emissions for any of the SVE systems, due to the emission control devices installed on them. Once the risk assessments are completed for the air stripper and the SVE systems, the SMAQMD will mail a letter concerning any required emission controls.	The comment has been noted and no response is necessary.

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DTSC COMMENTS (DATED 1 MARCH 2004)						
1.	4			DTSC (Tami Trearse)	General Comment 1: The Air Force's proposed action appears adequate to address the concern of private wells being used in an unadvised manner. However, in addition, the Air Force should identify a potential contingency plan should the County Health Department chose not to act on the Air Force's recommendation.	AFRPA will include a notice in the newsletter addressing private off-base wells. The details of the wording will be worked out among the Community Relations team.
2.	7				Specific Comment 20: The Air Force's response adequately explained why burrowing animals have little potential risk of exposure. Recommend that the Air Force incorporate the text of their response into the document.	The text has been added to Section 7, Page 7-7, as requested.
RWQCB COMMENTS (DATED 1 MARCH 2004)						
1.				RWQCB (James Taylor)	Staff of the Central Valley Regional Water Quality Control Board (Regional Board) has reviewed the subject document (Report), submitted on 2 February 2004. The purpose of the Report is to determine if selected remedies are protective of human health and the environment. The Report also identifies remaining issues and makes recommendations to attain or maintain protectiveness. Board staff has reviewed the Report and the Responses to Comments and have determined that our comments on the draft (letter dated 17 October 2003) have been adequately addressed.	The comment has been noted and no response is necessary.

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USEPA COMMENTS (DATED 23 FEBRUARY 2004)						
1.				USEPA (Carmen White)	The U.S. Environmental Protection Agency (EPA) has reviewed the January 2004 draft final Five-Year Review Report for the former McClellan Air Force Base. For the most part, the draft final addresses EPA's comments. However, as has been discussed, EPA believes it would be more accurate to call this Five-Year Report a statutory review, not a policy review. EPA guidance states, "Regions should conduct five-year reviews for interim or early actions selected under CERCLA §121 consistent with section 1.2 of this guidance. For instance, Regions should conduct a review if... hazardous substances, pollutants, or contaminants remains on site above levels that allow for unlimited use and unrestricted exposure." Since Operable Unit B1 Cap and Drainage Ditch have left contaminants on site that require land use controls and deed restrictions on excavation, it appears a statutory review is warranted. If the Record of Decision (ROD) for OU B1 results in the removal of all contaminated soil and the access restrictions are removed, then a statutory review would not be required. In spite of this disagreement over "policy" vs. "statutory" reviews, the Five-Year Review Report meets the substantive requirements for a statutory review and in other respects satisfactorily follows EPA guidance and meets National Contingency Plan requirements for conducting a five- year review. Therefore, EPA has no further comments and looks forward to the issuance of the final Five-Year Review Report.	The comment has been noted and no response is necessary.

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USFWS COMMENTS (DATED 20 February 2004)						
1.	Section 6, OU B1	6-3		Beckye Stanton	The Service recommends further clarification throughout this section on when sediment traps are sampled and sediments removed. On page 6-3, please note that sediment trap sampling occurs twice a year in the first and fourth quarters and list which calendar months these are to distinguish between calendar and fiscal years.	Currently, sediments are removed and the sediment traps are sampled during the first and fourth quarter, i.e., in March and December of every year. The text on Page 6-4 has been clarified to include the calendar months of the sampling events and removal of the sediments.
2.	Section 6, OU B1	6-4			On page 6-4, please include text, as in the response to comments, which mentions that analyses for the other chemicals of concern (COCs) are performed only if the total concentration of polychlorinated biphenyls (PCBs) exceeds 0.0025 mg/kg, dry weight.	The last paragraph on Page 6-4 has been modified as follows: "In accordance with the O&M Plan, which specifies that analysis for the other COCs are performed only if the total concentration of PCBs exceeds 0.025 mg/kg, sediments from this sediment trap were also analyzed for the other COCs, including PAHs, dioxins and furans, and metals. No PAHs or dioxins/furans were detected, and no metals were reported above background levels. Sediments accumulated in the sediment traps will continue to be removed during routine maintenance activities and monitored for COCs per this protocol (Mr. S. Mayer, 2003 interviews, Appendix B)."
3	Section 6, OU B1				Please clarify whether metals were not detected in the First Quarter 2003 sampling or detected below ambient concentrations and revise the text appropriately for both the sediment trap and the unlined ditch samples.	Metals were detected in the First Quarter 2003 sampling at concentrations below background levels. The text on Page 6-5 has been clarified to reflect that metals concentrations were at or below background levels and not non-detect, as previously stated.

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4.	Section 6, OU B1	6-3			On page 6-3, please clarify what levels of COCs were consolidated and covered by the cap in 1994 and what levels of COC concentrations remain unremediated. From the text on page 6-9, the cap appears to cover only PCB contamination above 10 mg/kg, dry weight and soils with concentrations of dioxins and furans above 1 μg/kg, dry weight. Please discuss why erosion/runoff of the unconsolidated soils was not considered a possible source of the PCBs detected in the sediment trap and unlined ditch in First Quarter 2003.	The text in Section 6.2 has been modified as follows to provide a better description of the history of the cap construction: "In the 1994 implementation of the interim remedial action, the upper 18 inches of soils were excavated from portions of PRL 29, SA 13, and the southern portion of SA 12A, where PCB concentrations exceeded 10 mg/kg. The excavated soils were consolidated in the northwestern portion of OU B1, in SA 12A. A surface water drainage system was installed, the excavated areas were backfilled with roadbase material, a sediment trap was installed in the drainage channel, and Site 12A was covered with an 8-acre asphalt cap. Currently, SA 12A and SA 13 are paved lots and PRL 29 is gravel covered and surrounded by paved areas. PCB-contaminated soils are not exposed at the site and therefore cannot contribute to contamination of the ditches through erosion/runoff. Three sediment traps are in place to monitor the effectiveness of the cap."
5.	Section 6, OU B1				The Service recommends that the quarterly inspection activities currently monitoring the integrity of the gunite lining also include monitoring the amount/height of accumulated sediment in the traps to support the assumption that no sediment from the traps is remobilized during the periods between the twice a year removals.	The sediment traps are concrete vaults, 3 to 5 feet deep, and create a basin for stormwater flow from the drainage ditches. Very small amounts of sediment (about 1/2 inch) accumulate in the sediment traps during each storm season. No sediment is washed over the weir of the traps between the sampling/removal events and therefore no remobilization takes place. Future monitoring of the sediment traps will make note of the amount of sediment that has accumulated in the traps between sampling events. No changes have been made to the text.

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1.	Table 6-2				Please include the concentrations of COCs used to define "contaminated soils" in each of the response actions listed for OU B1 on Table 6-2.	The 1994 remedial action (i.e., consolidation of contaminated soils and placement of the cap) was implemented to mitigate the pathway of exposure to workers from the dominant COCs (i.e., PCBs and dioxins/furans). The IROD defined remedial action objectives only for PCBs and dioxins/furans because these COCs were considered the risk drivers for exposure. It was agreed that remedial action objectives (RAOs) for the other COCs would be addressed in the final ROD. As implemented, the 1994 remedial action resulted in the placement of an asphalt cap over all areas of potentially contaminated soil, so no COCs are exposed at the site. The 2002 remedial action of the drainage ditches used the following for RAOs: 1) non-detect values for PCBs (0.025 mg/kg) and PAHs (0.00056 mg/kg); 2) benthic invertebrate toxicity equivalent concentration levels for dioxins and furans (0.86×10^{-6} mg/kg for Total TCDD/Furans, Canadian Council of Ministers of the Environment, 2001), and 3) background levels for metals. The last column on Table 6-2 for OU B1 and the text on Pages 6-4 and 6-12 were expanded to include this information.

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2.	Table 6-2				For CS-10 on Table 6-2, a maximum concentration (5900 mg/kg soil) is listed for pesticides overall with no concentrations for individual pesticides, and no pesticides are listed as in the "COPCs" column. Please identify and list maximum concentrations for the specific pesticides determined to be COPCs and COCs for this site.	Pesticides should have also been identified as Contaminants of Potential Concern since they were reported at low concentrations during the 1998 remedial investigation. The maximum concentrations of pesticides were 0.006 mg/kg for 4,4-DDD; 0.01 mg/kg for 4,4-DDE; and 0.0068 mg/kg for 4,4-DDT. The previously reported concentration of 5,900 mg/kg was identified during an investigation at IC 19 and research showed that this concentration was not specific to CS-10. In the process of researching this information, dioxins and furans were also identified as main contaminants of concern for CS-10 (0.034 ng/g as TCDD equ.). The maximum concentration reported for radium 226 was corrected to 10,100 pCi/g. Table 6-2 has been revised to present the correct COPCs and COCs. The maximum concentrations for the non-radiological contaminants were not available but will be reported in the forthcoming IRP Final Survey Field Sampling Plan Confirmed Site 10, URS, 2004.
3.	Table 6-3				As mentioned above, the text on page 6-9 and page 1 of Table 6-3 infer that PCB contaminated soils with concentrations under 10 mg/kg, dry weight and dioxin/furan concentrations less than 1 μg/kg were left in place and are not currently under the cap. In Table 6-3 for OU B1, please identify whether the residual soil contaminated with COCs below the consolidation/capping criteria has a potential pathway to the ditch and whether the existing sediment traps and frequency of monitoring and sediment removal are sufficient to control this potential source.	Please see Response to Comment No. 4 above.

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SMAQMD (DATED 2 MARCH 2004)						
1.				SMAQMD (Loni Adams)	The SMAQMD has no other comments for the Five-Year Review Draft Final Review other than what we had already commented on during the first draft review. The District mailed a letter to you a few months ago concerning the public health risk assessment results for the groundwater treatment plant, which indicated no significant public health risk for the air stripper exhaust. The SMAQMD has not completed the soil vapor extraction systems health risk assessment that was mentioned in the first draft comments. The District is still in progress with the review of sampling data for the soil vapor extraction systems.	The comment has been noted and no response is necessary.
CALIFORNIA DEPARTMENT OF FISH AND GAME (DATED 15 MARCH 2004)						
1.				CA D&FG (Jim Hardwick)	I have made a cursory review of portions of the report, and have no comments. I do however, look forward to continuing to work with the Air Force as they evaluate ecological risks and develop remedies for those risks found at McClellan.	The comment has been noted and no response is necessary.